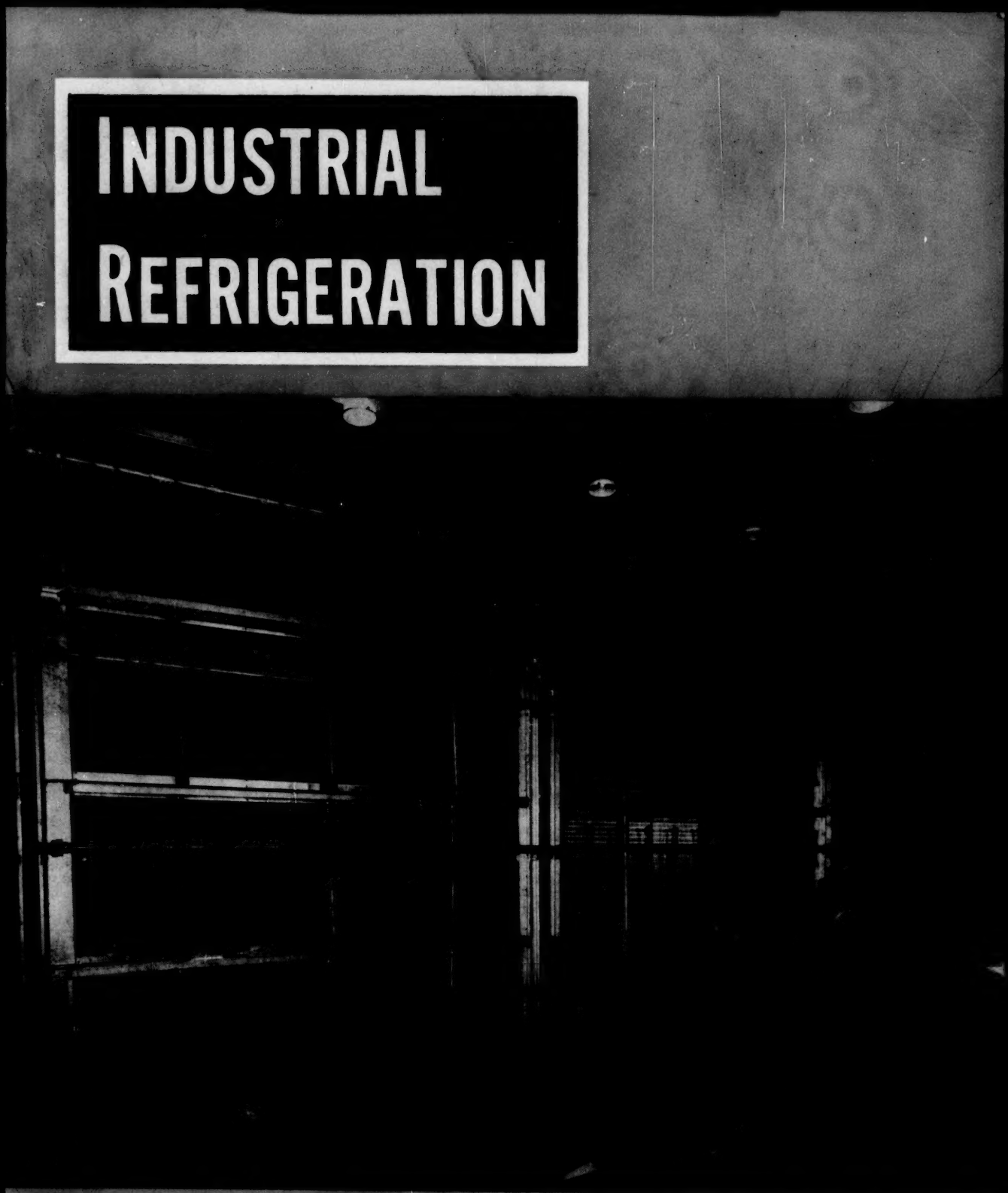
INDUSTRIAL REFRIGERATION



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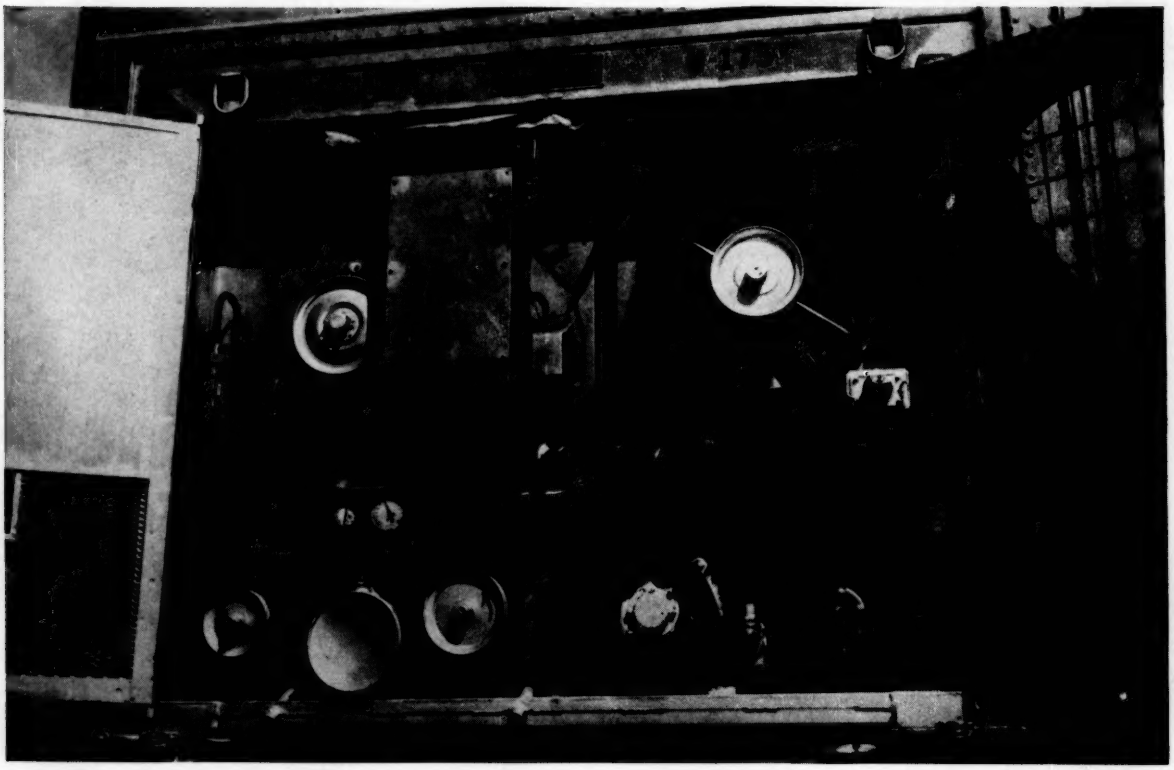
VOLUME 132
NUMBER 1

JANUARY, 1957

Perishables need it en route

DEPENDABLE COMPRESSOR PERFORMANCE

The photo shows the compressor installation in a refrigerated truck.



DEPENDABLE performance is a must if perishable cargo is to be delivered "garden fresh." So here, as in refrigerating plants of all types, operators use *Texaco Capella Oil (Waxfree)*.

Texaco Capella Oil (Waxfree) is the oil that *won't precipitate wax* in the compressor system—even at temperatures as low as minus 100° F. *Texaco Capella Oil (Waxfree)* has notable stability and resistance to oxidation. It does not foam, is moisture-free and compatible with all refrigerants.

There is a complete line of *Texaco Capella Oils (Waxfree)* to meet the needs of all types and sizes of compressors. All exceed the requirements of the Freon floc test as well as the specifications of leading refrigeration manufacturers.

Texaco Capella Oils (Waxfree) come in refinery-sealed 55-gallon and 5-gallon drums, 1-gallon cans—and the most-used grades in 1-quart containers.

Let a Texaco Lubrication Engineer help you select the proper ones for your operation. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Capella Oils (Waxfree)

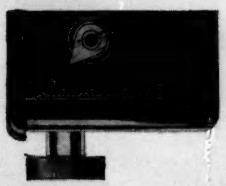
FOR ALL REFRIGERATING AND AIR CONDITIONING COMPRESSORS

TUNE IN . . . METROPOLITAN OPERA RADIO BROADCASTS EVERY SATURDAY AFTERNOON

ELECTRIC Heating Cable DEFROSTERS

for LOW TEMPERATURE DOORS

1 • Temperature adjustment control.



2 • Adjustable thermostat for range of +85° to +245° F.

3 • Steel electrical outlet box for making connection between heating element and thermostat—inlet for power.

4 • Rabbeted channels into casing.

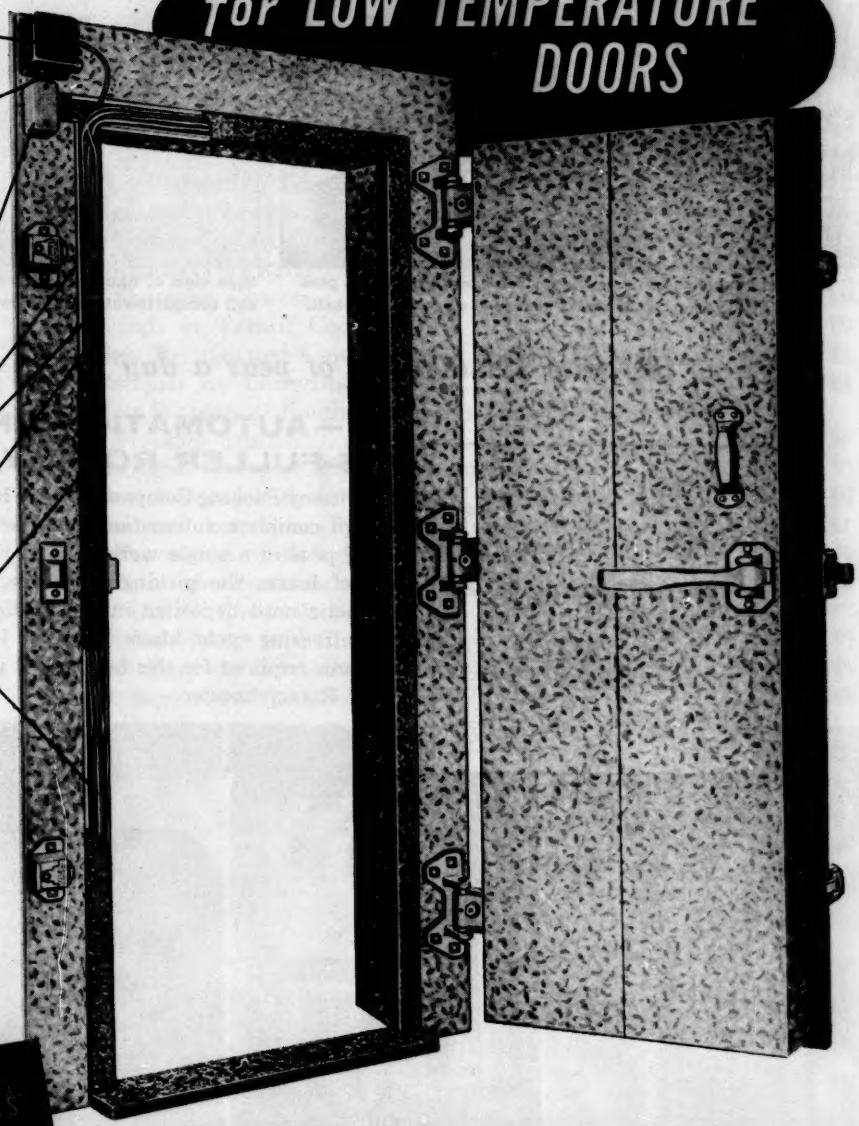
5 • Fireproof No. 26 gauge galvanized metal lined inside channel.

6 • Lead covered "heater cables" (4) held down securely by clips —approximately 20 watts to a foot. (110 volts—60 cycles).

7 • No. 10 gauge galvanized steel cover plates—removable.

8 • Capillary tube controls (on and off) thermostat.

The purpose of heating cables is to prevent icing conditions at the frame and sill areas where the door gaskets make their contact. The cables which are recessed into the frame casing are electrically heated and controlled by a "calibrated thermostat" (new improved feature by Butcher Boy), adjustable above the "dew point" of the air temperature. Since the heat expended prevents condensation it thus prevents freezing conditions.



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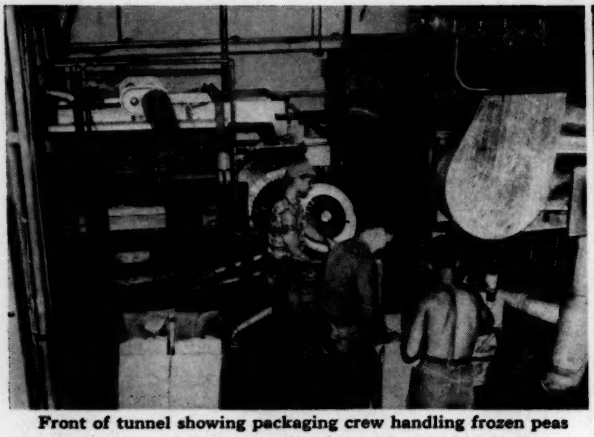
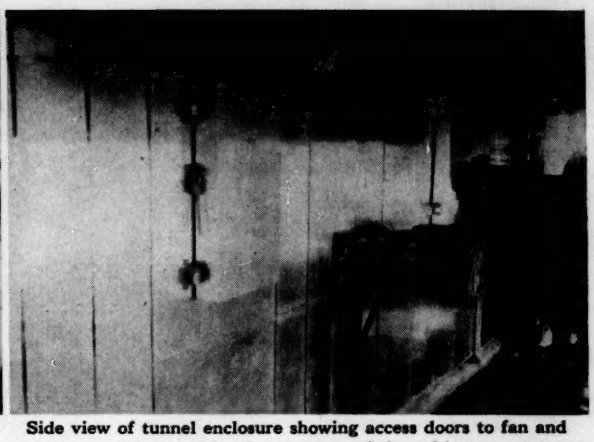


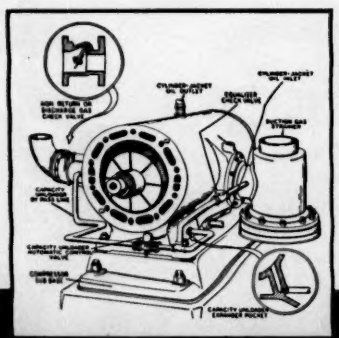
Front of tunnel showing packaging crew handling frozen peas from storage hopper at outlet of second stage freezing belt.



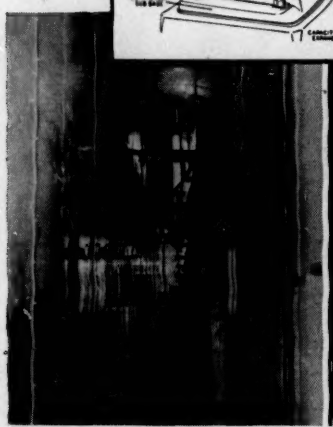
Side view of tunnel enclosure showing access doors to fan and coil compartments. Also shows a part of the refrigerant piping.

how to freeze 100,000 lbs. of peas a day

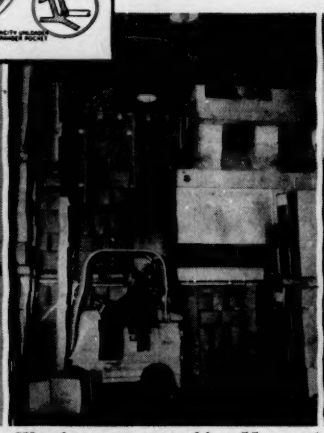
—AUTOMATION AND THE FES-FULLER ROTARY BOOSTER



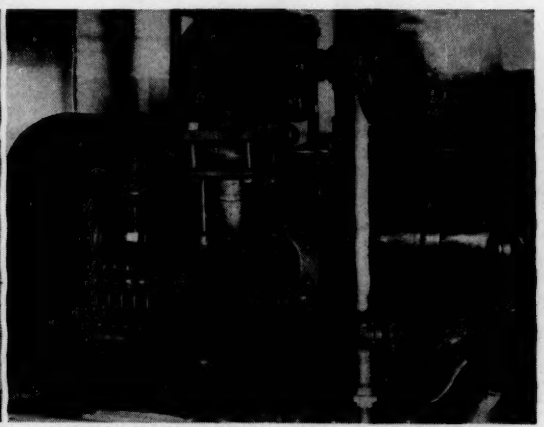
The Nittany Packing Company, Centre Hall, Pennsylvania has, through complete automation, processed more than 100,000 lbs. of peas in a single working day. From the moment the product leaves the picking table, the operation is entirely automatic until deposited in the loading hopper at the end of the freezing cycle. Maintaining the low and constant temperatures required for this belt tunnel is the job of the FES-Fuller Rotary booster.



Freezing Equipment Sales refrigerated flume used to transfer product to first stage. Also precools product to increase tunnel capacity.



Warehouse man stacking 55 pound cartons of frozen product. Product is stacked eighteen feet high. Storage designed to hold one week's production from tunnel.



FES-Fuller Rotary which serves as the heart of the refrigeration system.

Send for complete information.

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LOW TEMPERATURE FREEZING EQUIPMENT

Potential Applications of Atomic Energy

WITH so much in the news recently about the H-bomb it is good to learn that the American Society of Heating and Air-Conditioning Engineers has been studying more beneficial potential applications of atomic energy.

It is explained by a committee of engineers prominent in the heating and air-conditioning industry that the fusion or thermonuclear process for combining atoms has so far been utilized only in the H-bomb. In the foreseeable future only the fission process, making use of a nuclear reactor, offers controllable release of atomic energy at usable temperature levels. The nuclear fission reactor is a "furnace" which burns as fuel one of the radioactive elements.

All current evidence indicates that it may be feasible to use nuclear reactors in large size applications to provide central heating or heat-operated refrigeration for entire communities or groups of large buildings, but such use for home heating is technically and economically unsound.

Predict "Package Reactors" In Near Future

It does seem likely, according to the Nuclear Energy Engineering Committee of the Society, that in a few years package reactors will become economical for power generation in those parts of the world where other fuels are scarce. As costs come down atomic energy may eventually compete with conventional fuels in this country.

However, when used to generate heat or power the economic usefulness of atomic energy must be judged along with other fuels on an investment, operation and maintenance basis.

The design and construction features required to assure safety of nuclear furnaces add greatly to their cost, it is pointed out by the committee. Radiation shielding is bulky. Spent fuel must be replaced by remote handling techniques. Control equipment is complicated. Precautions to safeguard operating personnel are expensive.

Although no efficient conversion mechanism has yet been devised, the committee statement concludes it may be possible within this lifetime to convert a large proportion of the energy from nuclear reactors into electricity or other high level forms of energy.

Industrial Refrigeration

Now in its 66th Year of Publication

J. F. NICKERSON, FOUNDER

Vol. 132 **January, 1957** **Number 1**

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The Cover:

Nearly ten miles of copper tubing and 208 square feet of face area is pictured in this air conditioning spray coil, developed by The Trane Company, for use in the Hudson Eastland Shopping Center in Detroit. Shown in the process of fabrication, the coil, one of five such units which will deliver 500,000 cubic feet of conditioned air per minute when installed. The coils each include eight coil banks, stand 169 inches high, 268 inches wide and utilize over 300 spray nozzles. The units will be covered with panels when finally assembled.

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What's New

MACHINERY
APPLIANCES • PROCESSES

Calibrated Expansion Valve

CALIBRATED discs are provided on the new Watkins "Cali-Flo" hand expansion valve. These permit setting the valve opening for the rated tonnage of a

Watkins hand expansion valve, Cali-Flo Model C-F-V-½ inch

cooling or freezing coil, as controlled by the pressure drop through the valve. For example, the "Cali-Flo" Model CFV-½ inch valve (pictured) has ½ inch connections, can be set for ammonia evaporators rated from 1 to 18 tons at the existing pressure drop. Manufactured by the J. E. Watkins Company, 307 Lake Street, Maywood, Illinois.

Ice Painting For Arenas

ICE SPORTS arenas will be interested in a recent announcement by E. R. Carpenter of Cleveland, Ohio, concerning additional developments to and marketing of ice painting apparatus. This equipment can be used with certain chemical material to impart colors to ice on arena floors. Such coloring can be used to develop patterns on the floor for ice shows or for placing lines for hockey matches. It can also be used for layout of curling rinks. The conventional water pump, a 300-gallon steel mixing tank, hose and Carpenter's spray nozzle are used for distributing the chemical material over the ice.

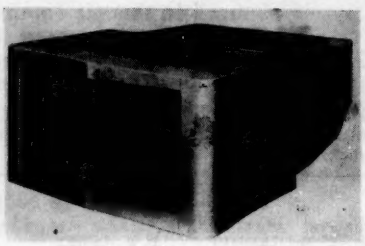
The chemical is known as Astroloite and is distributed by the Glidden Paint Co. Four 50-lb. bags are used, mixed with water to make up the spray material. It takes 15 minutes to mix up a batch which will cover 17,000 square foot with two coats. Carpenter estimates the labor and material cost of an application of this size at $30.00. He states that the cost of coloring the Cleveland Arena which Carpenter estimates as having the highest labor figures in the country, would be $650.00 per application.

Any rinks or ice sport business enterprises interested in his development may obtain Ice Painting Instructions which lists the equipment required and detailed application instructions, including a plan of how to install the tank and pump. Information on the equipment itself may be obtained from Associated Parts & Tools, Inc., Cleveland 11, Ohio.

New Light Weight Cargo Cooler

INTRODUCTION of a compact, lightweight hydraulic-drive Hunter Cargo Cooler marks the entry of Hunter Manufacturing Co., Solon, Ohio, into the field of mechanical refrigeration for the transport industry. Hunter has been a manufacturer of transport heating and dry ice refrigeration systems for more than 18 years.

The new mechanical refrigeration unit, Hunter Cargo Cooler Model HE-15-A, weighs only 360 pounds. It has a cooling capacity of 14,200 Btu per hour at 20 F evaporator and 90 F ambient temperatures, capable of maintaining required tempera-



New Light Weight Hunter Cargo Cooler Model HE 15-A

tures under the most severe conditions. It is designed to meet protective refrigeration requirements in the medium temperature ranges between 35 F and 50 F in 4-wheel truck bodies up to approximately 14 feet in length, for either long or short haul operation. Subsequent Hunter mechanical refrigeration models will be available for higher capacity truck and trailer requirements.

The new cargo cooler occupies a minimum of payload space. It is mounted in the front wall of the truck body above the cap with approximately two-thirds of the unit outside the cargo area. Light weight coupled with high cooling capacity makes the unit rate high in refrigeration capacity per pound of weight.

Power input requirements per unit of refrigeration capacity are extremely low. Power from the truck engine is transmitted to the cargo cooler through a hydraulic pump which drives the refrigeration system at constant speed, regardless of vehicle speed. A fully automatic thermostat starts and stops the unit to maintain the preset temperature. When truck is parked, an optional, auxiliary electric motor which plugs in on available current, either 110 or 220 AC, may be used to assure safe, overnight cargo protection.

Humidity Detection in Sealed Packages

A device said to be inexpensive and fool proof, can determine whether moisture within sealed packages is endangering the contents. It consists of an electrical sensing element and housing, an indicator and a mounting assembly.

Changes in existing water vapor within any sealed package can be detected instantly by means of an easy to read indicator. The system's efficiency is not affected by the size of the package. The device is manufactured by El-Tronics, Inc., Philadelphia, Pa.

Multiwall Bags

FOR FROZEN bulk vegetables, multiwall bags are being recommended by Crown Zellerbach Corp. The bag consists of 3 to 4 walls of long-fiber stock with the inner wall either of polyethylene bonded to kraft or a specially wax-coated kraft. Advantages claimed are low cost, safe and compact storage because they do not collapse when stacked, easy handling. Bulk-packed product can be disposed of more easily at the end of a season than brand-packed product and can be used by institutions and remanufacturers. For fresh iced vegetables multiwall bags are getting increased consideration.

PHILLIPS

1. Field proven superchargers for any application—all temperature ranges—all operating conditions.
2. Power element case and stainless steel diaphragm welded into one piece. Field tested for over 25 years.
3. External superheat adjustment. (Internal available).
4. External equalizer. (Internal available).
5. Simple cage assembly contains only one packed stem. Replaceable for quick servicing. Interchangeable for wide capacity range.
6. Tight seating—stainless steel stem and seat.
7. Outlet connections to match distributor requirements.
8. Easy to install, light weight flanges—in widest variety of body styles and connections.

12 points of quality in ALCO

"T" SERIES THERMO VALVES

BUY QUALITY—BUY ALCO

ENGINEERED THROUGHOUT FOR TROUBLE-FREE OPERATION!

9. Rugged come-apart constructions—corrosion-resistant materials.
10. Can be mounted in any position.
11. Simple, compact design — only three major parts—interchangeable to provide wide capacity and operation ranges.
12. Easy to inspect, clean and service without breaking line connections—no special wrenches or gauges required.

NON-ADJUSTABLE, HERMETICALLY SEALED MODELS ALSO AVAILABLE

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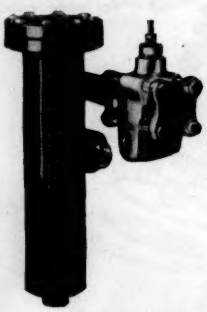
Modulating Valve Action Gives Smoother, More Efficient Operation

Phillips Controls continuously adjust refrigerant flow to the refrigeration load. *All* the evaporator tubes are kept wetted *constantly* to produce the best heat transfer rate of which your equipment is capable. "Hunting" in system is eliminated, thus compressor loads are even and maintenance is kept low. Check the following against your own requirements.

REMOTE FEED VALVES

No. 101 Remote Feed Valve with Float Chamber for Ammonia or Freon.

For shell and tube type coolers, large room coils and various types of tank coils. Float with adjustable level located in chamber outside the evaporator; "Level-Eye" with Frost Shield on chamber shows normal liquid level. Capacities to 50 tons for ammonia, 12 tons for Freon.



No. 301 Remote Feed Valve for Ammonia or Freon.

Cartridge-type unit for easy replacement of needle and seat. Float chamber (equipped with "Level-Eye" with Frost Shield) connects to evaporator with balance or equalizing lines. Capacity to 50 tons ammonia and 10 tons Freon.

PILOT OPERATED FEED VALVES

Phillips Pilot Float Valve with level adjustment and "Level-Eye".

Pilot operation of valve permits higher capacities to be handled with modulating-type control. Can be operated by Phillips Pilot Valves, thermal expansion or solenoid control. Models for both high and low side installation. Capacities from 1 to 1000 tons for Freon, 1 to 2000 tons ammonia.

Phillips Pilot Operated Feed Valve

Write for full details and typical hook-up drawings.

PHILLIPS **H. A. PHILLIPS & CO.**
DESIGNERS AND ENGINEERS
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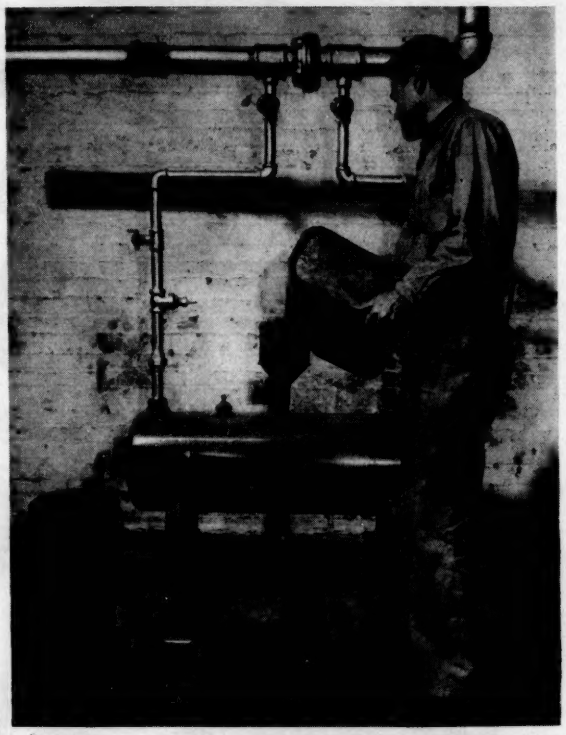
What's New



Typical water treatment installation for supermarket refrigeration or air conditioning system is shown being serviced.

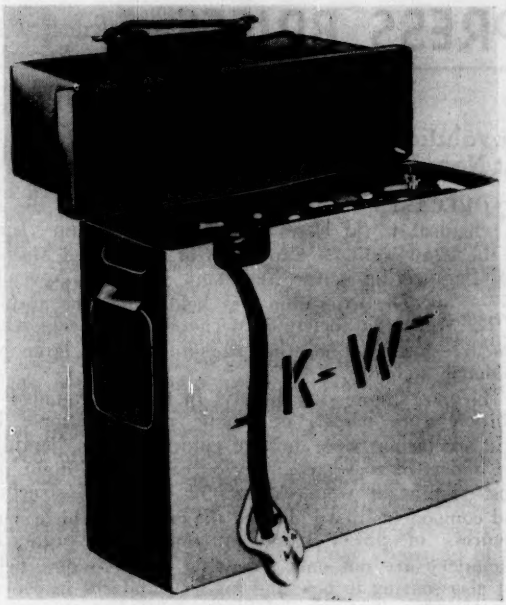
Chemistat Units Introduced

PROPORTIONING feed apparatus for water treatment of refrigeration and air conditioning systems has been announced by Water Service Laboratories, Inc., New York City. The equipment, known as a Chemistat, is a proportioning feed connected to the circulating water which assures the introduction of chemical solution in small amounts whenever water is being circulated. A serviceman collects water samples at regular intervals for analysis to make certain that the proper kind and amount of chemicals are being fed.

Rider Truck Battery Charger

FORMERLY available for walkie type trucks, the K-W battery complete power unit is now made for use on rider type lift trucks, made by The K. W. Battery Co., Skokie, Ill. The complete power unit has a permanently mounted charger, thus permitting the truck battery to be given a power boost whenever truck is not in operation during the day or overnight. It can be easily charged by plugging the charger into any 110 or 220 volt, 60-cycle outlet, wherever truck may be. Charger can be left "on" without damage to battery, and routine charging can be done overnight with no loss in truck use or need for substitute battery; this eliminates need for special charging area. It is not necessary to disconnect battery from truck since charger is permanently connected to the terminals.

This power unit has easy access to battery for adding water. Charger is completely automatic and rate of charge is controlled by the state of charge for the battery. There are no moving parts, no fans, relays or contacts. Size and type are dependent upon make and model of truck, and availability is through plants in Skokie, Illinois, or Brooklyn, N. Y.



Charging Battery on Fork Truck

Allis-Chalmers Announces New "Magi-Key" Sheave

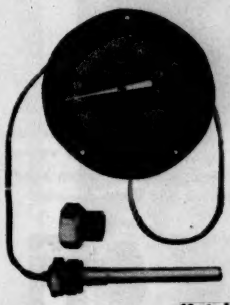
INTRODUCTION of new one and two-groove "Magi-Key" sheaves for quick and easy speed adjustment of "Texrope" V-belt drives in A and B sections has been announced by Allis-Chalmers Manufacturing Company, Milwaukee, Wis. Designed for low horsepower applications, the "Magi-Key" sheave provides for increased maximum design horsepower. For example, a "Magi-Key" sheave, the same size as a former two-groove B section cast iron adjustable sheave, will handle approximately three times more horsepower.

In the new "Magi-Key" sheave, keys transmit all rotational torque, i. e., from shaft to hub and hub to discs. Set screws no longer bite into threads.

Two groove adjustable sheave assembled view showing Magi-Key.

Need thermometers? ...ASK TAYLOR

IF you do you can't do better than call your Taylor Field Engineer. He is a specialist in temperature measurement. And Taylor makes a wide variety of thermometers for just about every possible application in the refrigeration industry. If you prefer, write for **Catalog 300.** Taylor Instrument Companies, Rochester, N.Y., or Toronto, Canada.



THERMOGUIDE* Dial Thermometer
An extremely reliable and sturdy vapor-actuated instrument for Brine Lines, Brine Tanks, Ammonia Lines, Cold Storage Rooms, Refrigerators, etc. Variety of standard ranges from minus 40° to + 120°F. Four forms of bulb and connection. Case diameter 6½".
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Metal Wall Thermometer
Easily read, even in dimly lighted areas. Non-fading red liquid in magnifying tube and black figures and graduations on white background. Flanged edges give tube maximum protection. Range minus 40° to + 70°F., in 1° divisions. Length 12".
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Taylor Industrial Thermometer
Exclusive BINOC* tubing, makes it three times easier to read. For Cold Water, Brine, Ammonia, Condenser, Hot Water and Steam Lines, Brine Tanks, Cold Storage Rooms, etc. Many bulb and stem styles and angles. Ranges minus 40° to 950°F. or equivalent Centigrade. Illustrated,
No. 1185385, $29.50

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Bi-Metallic Dial Thermometer
Gives high degree of accuracy at low cost. All-metal stainless steel construction. 3" or 5" diameter case. Stems 4", 6", 9", and 12". Separable wells, ⅜" and 1"; 2" extension neck for 6" and 12" stems. Ranges from minus 40° to +750°F. Ranges up to 400°F. damped against vibration. $16 to $26, depending on dial size and stem length.

Taylor Instruments
MEAN ACCURACY FIRST

FRICK

High-pressure Valves & Fittings

Large handwheel

Long oversized stem

Ample packing

One-piece collar box and bonnet

Back seat permits repacking in use

High-angle seat insures tightness

Standard flanges: screwed sizes to 2"

Full opening; developed for heavy duty

Are preferred for high-pressure services, 300 to 1500 lb., 300 degrees. Sizes ¼" thru 14". Stocked by Frick Distributors, the world over. Get new catalog with prices, weight, dimensions, working pressures, parts and useful tables.

Frick line includes fittings, safety valves, gauge glasses, return bends, manifolds and welded work.

WAYNESBORO, PENNA., U.S.A.

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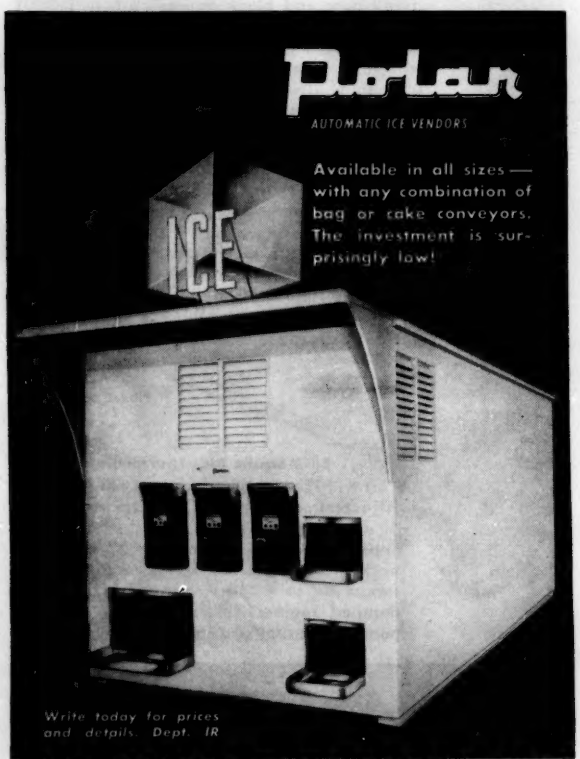
AUTOMATIC ICE VENDORS

Available in all sizes — with any combination of bag or cake conveyors. The investment is surprisingly low!



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PRESS BRIEFS

Revolution In Power Shown At New York Exposition

FORECASTS of an impending revolution in the mechanical world were strongly impressed on visitors at the 22nd National Exposition of Power and Mechanical Engineering in the New York Coliseum, November 26 — 30. The exposition was held under the auspices of The American Society of Mechanical Engineers, whose concurrent annual meeting brought forth a large professional audience.

The most impressive displays in the well-rounded exhibition were models of atomic power stations. The most spectacular were those of guided missiles, heralding the impact of rocket enginery on commercial flight. The most significant were exhibits of materials, structures and components that indicated the extent to which manufacturers of power plant equipment and production machinery are not only spreading out into new fields, but also soaring to new and higher standards in conventional product design.

One aspect of the upsurge in research and development that the exposition forecast is the tremendous investment that is going into experimental and production facilities, all of which consume power and demand increased power production. This demand is rapidly being satisfied by the consumer industries themselves, and even more extensively by the public utilities.

The comprehensive display of materials-handling equipment included among other new presentations, a conveyor actuated by a revolving lead screw, which has unique advantages, and an inplant tractor with remote radio control which permits a single operator to handle the loading of an entire trailer train. A companion unit is an electronically-controlled tractor that is steered, started and stopped automatically by means of a tracking tape laid on the floor.

Meet to Review Safety Code For Mechanical Refrigeration

THE Interpretations Sub-Committee of the ASA B9.1 Sectional Committee to which is delegated the responsibility interpreting the provisions of the Safety Code for Mechanical Refrigeration met in Boston, November 25, to consider confirmation or changes in the Code in accordance with the American Standards Association which call for a complete review every three years. The sub-committee is under the chairmanship of Joseph Chamberlain, York Div., Borg-Warner Co.

One of the prime matters considered by the committee was the application of safety measures to low temperature systems which employ relatively high pressure refrigerants. The Sub-Committee has submitted recommendations on this subject for the further consideration by the full sectional committee. It was noted that a number of such system have been rejected by local authorities as not meeting the code requirements for such apparatus, resulting it is said, from a lack of proper information, rather than a desire by the enforcing authorities to prohibit the use of such equipment.

The committee plans to hold a series of meetings soon to prepare a revised draft for submission to the Sectional Committee.

New Refrigeration Principles Exhibited

TWO new refrigerators employing radically new departures from normal cooling systems were exhibited at the "Research Exhibit" at the 43rd semi-annual meeting of The American Society of Refrigerating Engineers held in Boston, Mass., November 26 to 28, 1956 at the Hotel Statler.

One of these, the electronic refrigerator developed by RCA Laboratories, was exhibited under the auspices of Whirlpool-Seeger Corp.

A magnetic Refrigerator, that according to claims will maintain lower temperatures than any previous apparatus, was exhibited by Arthur D. Little, Inc., Cambridge, Mass. This unit has no moving parts or flowing fluids. Using the principle that certain materials will warm up when magnetized and cool when demagnetized, temperatures approaching absolute zero are obtainable with this apparatus and are maintained for long periods of time. The ADL Magnetic Refrigerator is believed to represent the first commercial application of "superconductivity," said O. L. Spawn, Du Pont, chairman of the research exhibit committee.

Refrigeration Workshop To Be Feature at Poultry Conference

FIVE program worshops and a huge exhibit will headline the 28th annual Fact Finding Conference to be held by the Institute of American Poultry Industries in the Municipal Auditorium, Kansas City, Missouri, February 15, 16 and 17.

During the three-day business meeting, the five program sessions geared to the theme of "Blueprint for Progress" will be: Outlook Workshop, Refrigeration Workshop, New Idea and Research Workshop, Marketing-Merchandising Workshop, and Management Workshop.

The "Blueprint for Progress" theme will be carried into the exhibit, where more exhibitors than ever before in conference history will present an array of products, equipment and services that is unique in the poultry industry.

Friday afternoon at the Refrigeration Workshop, conference-goers will get a short course in the common failures of refrigeration, time-temperature-tolerance and the importance of spacing, packaging, proper stacking and materials handling. They will get a complete picture, too, of immersion freezing and what it could mean to processing operations.

Labor Department Issues Training Booklet

A POPULARLY written, illustrated booklet describing the national apprenticeship program has been released by the U. S. Department of Labor's Bureau of Apprenticeship. Titled, "Apprentice Training — An Investment In Manpower," the 32-page booklet explains in non-technical language the aims, organization, and operation of the national apprenticeship program.

According to W. F. Patterson, Bureau Director, the booklet is designed to answer inquiries concerning the national apprenticeship program received from employers, labor unions, young persons interested in learning a skilled trade, vocational guidance counselers, employment officers, and others concerned with industrial training. Copies of the booklet may be obtained free of charge from the Publications Branch, Bureau of Apprenticeship, U. S. Department of Labor, Washington, D. C.

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In the Spotlight

MANY CANNERS, food freezers, and cold storage operators add to their process facilities without regard to advantages which can be gained from planning such expansions. On page 20, an experienced engineer specialist, outlines the ideal "Expansible Freezing Plant". Based on operating efficiency, this ideal can be expanded economically and with minimum disruption. Even established plants can adopt most of the features to future construction.

TEMPERATURE controls to keep the place comfortable during summer and winter have been installed in the Southdale regional shopping center southwest of Minneapolis. The new twenty million dollar project has 72 stores covering 82 acres. The equipment for cooling and heating is, for the most part, located in a penthouse above the roof of the main structure. The outside air is pre-cooled during the summer and pre-heated during the winter to maintain a temperature of 75 F. For complete description of the refrigeration equipment and other details see article starting on page 15.

CORROSION, the ever present enemy of industry is being controlled to a greater extent each year as research develops preventative methods of minimizing this costly expense. Water, one of man's most valuable resources can be equally destructive in causing equipment break-down and hastening high replacement costs as outlined in the article on page 18.

TRANSIT COOLING, as it affects the ice industry, was the subject of a paper at the recent National Ice Convention by a representative of The Marketing Research Division of the U.S. Dept. of Agriculture. While mechanical refrigeration is making inroads, shipments of perishables are increasing, to serve an enlarging population, and there is a growing field for ice in this application. The paper is published in this issue, starting on page 19.

"PIGGY BACK — Fishy back" are relatively new terms for LCL shipments. Now a new refrigerated cargo unit called "Convert-A-Frate", designed to provide door to door service for refrigerated perishables in a container of approximately 700 cubic foot capacity, makes its appearance as detailed on page 21.

THE NATIONAL Ice Convention emphasized the need for selling its commodity at the retail level, in prepared form. The convention from the standpoint of attendance and interest was said to be the best one held in recent years. For a comprehensive report see page 23.

MANAGEMENT together with the operating department has a major responsibility in preventing refrigeration plant failures. How do equipment failures occur and how can they be avoided? The article, on page 31, a continuation of previous preventative maintenance articles, points out the necessary steps to be taken to insure against loss of property and life. It is worth serious review if your plant does not have a good maintenance program set up.

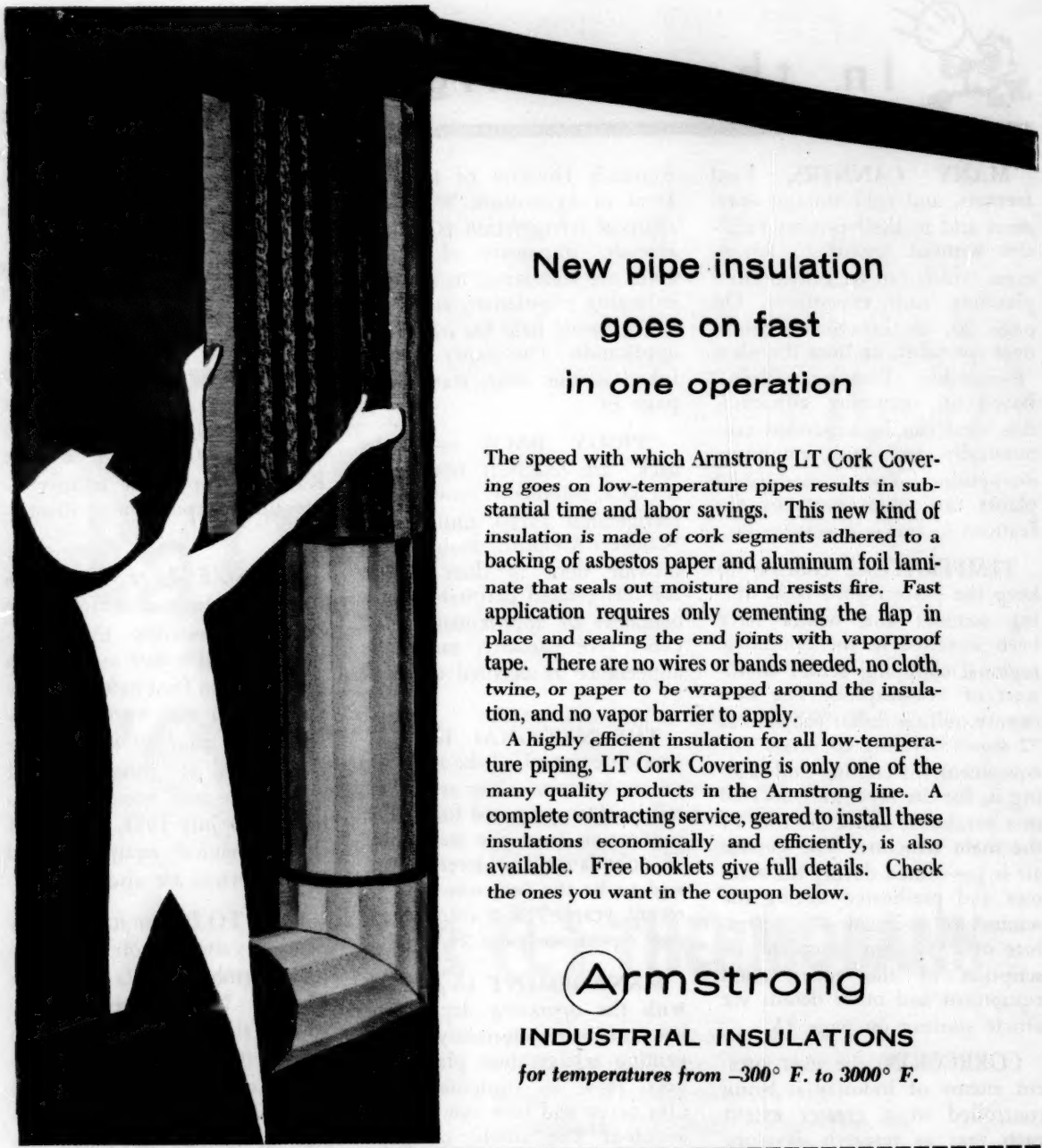
"HOW DO YOU go about finding the capacity of a booster compressor?" This question is answered in full in the NAPRE Question Box on page 37. Other equally interesting questions and informative answers are published monthly in this department. The Editors suggest you make it a regular reading habit.

EXCUSE US, PLEASE. In a transposition of illustrations appearing on pages 7 and 8 of the November 1956 issue, the new centrifugal compressor being manufactured by the Kathabar Division, Surface Combustion Corporation is shown in the article describing the Worthington multi-stage compressor, while the Worthington compressor is the illustration used in the Kathabar copy. The editors regret this transposition of illustrations.

THE SIZE of "two regulation football fields" is the way the reporter, describes the warehouse facilities now available in the Michigan fruit belt. The new addition to the warehouse described on page 30 doubles the capacity of the original plant which has only been in operation since July 1955. Details of the mechanical equipment and safety devices are also given.

SAID TO BE the first ice condensing vacuum cooler in operation, members of Los Angeles Chapter NAPRE recently inspected the new unit installed in the Union Ice Plant installation at Oxnard, California. The unit is reported to be the latest design of chilling apparatus. See page 42.

A NEW Refrigerated Warehouse completed and put in operation by Higley Cold Storage Inc., Mason City, Iowa, provides additional refrigerated space and blast freezing facilities. This warehouse was built and equipped according to modern ideas, one story in height. For details of this project see article on page 26.



New pipe insulation goes on fast in one operation

The speed with which Armstrong LT Cork Covering goes on low-temperature pipes results in substantial time and labor savings. This new kind of insulation is made of cork segments adhered to a backing of asbestos paper and aluminum foil laminate that seals out moisture and resists fire. Fast application requires only cementing the flap in place and sealing the end joints with vaporproof tape. There are no wires or bands needed, no cloth, twine, or paper to be wrapped around the insulation, and no vapor barrier to apply.

A highly efficient insulation for all low-temperature piping, LT Cork Covering is only one of the many quality products in the Armstrong line. A complete contracting service, geared to install these insulations economically and efficiently, is also available. Free booklets give full details. Check the ones you want in the coupon below.

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The Expansible Freezing Plant

V. C. PATTERSON

Patterson & Davis
Philadelphia, Pa.

ONE of the more important considerations in the layout of a plant for processing and quick freezing foods is to provide for future expansion. When adequate provisions are made in the original layout, expansion which is sure to come if the plant is successful, can be made economically, efficiently and with minimum interference to existing plant facilities.

Expansion of a food processing and quick freezing plant may be compared to the growth of a tree. When plant capacity is increased either because of stepped up production of existing products or addition of new food lines, the plant grows all over and must have room in which to grow.

Based on a lifetime of food plant construction experience, the layout shown in Fig. 1 is believed to be an ideal general arrangement for processing and for quick freezing vegetables. The plant should be located approximately 100 feet back from the public road on a site sufficiently large to permit truck access around the plant when it is expanded to maximum size.

Basic plant layout consists of a 40-foot paved roadway with a processing building on one side and a service building on the other side. The buildings should be designed so that the roadway could be roofed later to provide a covered passage between buildings and for temporary storage.

Building Floor Level Nearly At Roadway Grade

Floors of the buildings and the roadway between should be at the same level and this level should be slightly above grade for proper drainage. This feature results in lower building costs than a building with floor at truck bed height and permits fork lift truck operation in and around the buildings without ramps. It also permits large motor transports and motor trucks to be loaded or unloaded at any point around either building.

Length and width of the processing building is determined after analysis of quantity expected and the number of products for simultaneous processing, and length of each line which will secure the most efficient straight line production; taking into consideration freezer and finish product storage requirements. Since processing, freezing and finish product storage are in a separate building from the service facilities and raw product storage, the two buildings would seldom be the same width but it would be desirable but not essential that they be the same length.

With the various rooms that make up the two buildings properly located, it is easy to visualize this plant layout as a tree. The paved road is the trunk with the various rooms as the branches. When a plant grows it usually grows all over. Like a tree, this plant can grow.

Building Functions Detailed

Plant layout and functions of each building unit can be explained in more detail as follows:

Receiving Shed — The receiving shed is at ground level and should be roofed over. This arrangement permits fork-lift palletized opera-

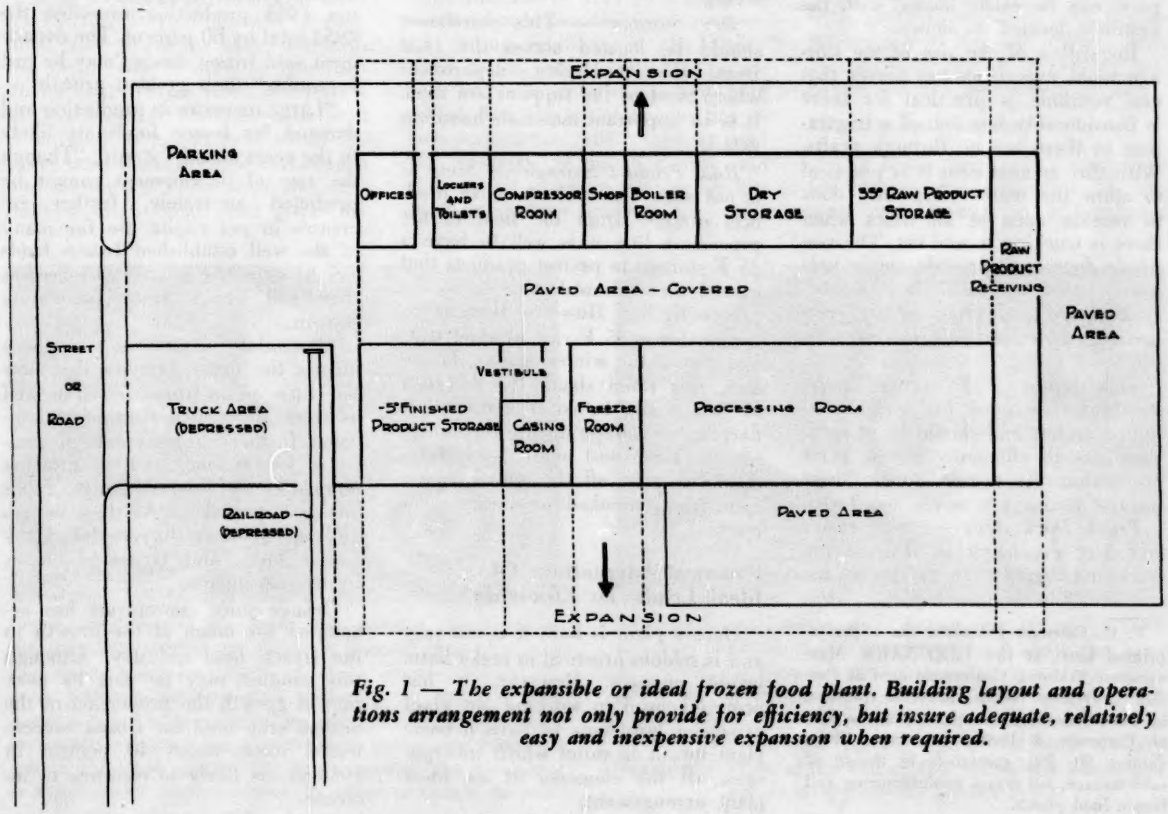


Fig. 1 — The expansible or ideal frozen food plant. Building layout and operations arrangement not only provide for efficiency, but insure adequate, relatively easy and inexpensive expansion when required.

tions, and affords some protection against climatic conditions.

Processing Building Units:

Processing Room — To provide proper lighting and ventilation for the processing room a roof monitor should be included in the design. This is important. Future expansion will tend to cut out light and ventilation.

Freezer Room — The freezers, regardless of type, should be laid out so that the products pass straight on from the processing room through the freezer room and into the casing area.

Casing — After the product has been cased it should pass immediately into a 35 F palletizing room.

Palletizing Room — Essentially the palletizing room is a large *vestibule* which serves the additional purpose of access to the minus 5 F storage room.

Minus 5 F Storage — This storage room has only one entrance, and it is on the plant side rather than the dock side. It is essential that all products enter the storage room easily and quickly after they are frozen. Therefore, the entrance into storage room is provided with this in mind, rather than for the convenience of loading trucks or rail cars. With the use of fork trucks rail cars and transports can be easily loaded with the vestibule located as shown.

Regardless of the size of the storage room, experience has proven that one vestibule is practical for there is considerably less loss of refrigeration as there are no through drafts. With this arrangement it is practical to allow the main refrigerator door to remain open at all times when there is trucking in and out. The *vestibule doors will provide ample protection when the vestibule is properly designed and protected by pressurizing with relatively warmer dry air.*

This minus 5 F storage room should be designed for high stacking on pallets and should be of sufficient size to efficiently handle plant production. As a rule, today, these storage rooms are never too large.

Truck Dock Area — It is easier and less expensive to depress the truck dock area than to elevate the entire plant even though it may be necessary to provide for pumping rain or wash-down water out of this depressed area.

Service Building Units:

Offices — The offices are at the front of the building and are close to all important operations.

Toilets and Locker Rooms — These facilities are located just across from the employees entrance to the offices. Such arrangement offers the maximum of personnel control.

Compressor Room — The compressor room is located just across the road from the cold storage and freezer room area where the refrigerating load is the greatest. Layout of this room and machinery location is as important to the expansible plant as any single item could be. However, details of such arrangements would be a paper in itself.

Shop — The shop fits in the heart of the plant and should be adjacent to the compressor room.

Boiler Room — While the boiler room is not directly across the road from where most of the processing steam is used it is not far away. The steam is easily and less expensively piped to the processing area, than refrigeration to the low temperature storage.

Dry Storage — This warehouse should be located across the road from the packaging department where most of the supplies are used. It is an important materials handling detail.

Raw Product Storage — Since it is not always possible to move products directly from the field to the processing line it is well to have a 35 F storage to protect products that cannot move immediately on to the processing line. However, there is little use for a 35 F raw product storage during the winter season. Therefore, this room should be designed so that it can be coverted to minus five degree storage during the winter season. Time and again, such foresight has paid off the added investment from unlooked-for storage revenues.

Practical Adaptations Of Ideal Leads To Efficiency

Once a plant is built it is not easy and is seldom practical to make basic layout changes. However, it has proved helpful in working out plant expansion problems to have a basic plant layout in mind which incorporates all the elements of an ideal plant arrangement.

V. C. Paterson presented the paper reprinted here, at the TRRF-NARW Management Training Conference held at Purdue University, West Lafayette, Indiana, in 1956. Patterson is a partner in the firm of Patterson & Davis, Engineers, Philadelphia 20, Pa., specialists in design of cold storage, ice cream manufacturing and frozen food plants.

Predict Bright Future For Frozen Foods

THE Agriculture Department predicts a rosy future for the frozen food industry. For many frozen foods now produced in small volume "a vast potential exists that could dwarf today's production," the department said in a review of the situation.

Production of the principal frozen foods in 1955 was about four and one-half times the 1946 output. The department points out that growth of the postwar industry did not result from a continued rapid increase in all frozen food products. Some have not become large volume sellers.

Fruits and vegetables were the first groups to expand rapidly. In 1946 they accounted for about half the total production of frozen foods. Now these account for less than one-fourth because other items are getting into the picture. After a sharp decline of frozen fruits and vegetables in 1947 the output of both generally has risen but at a slower rate than some newer products.

Frozen orange juice concentrate began a rapid growth in 1949. Until recently the total output of frozen juice concentrates (orange, lemonade and grape) has increased faster than the total output of all frozen foods. Prepared frozen foods also have entered a period of rapid growth. During 1955 production exceeded the 1954 total by 60 percent. The department said frozen meats "may be just beginning" their greatest growth.

"Large increases in production and demand for frozen foods are likely in the years ahead," it said. "Though the rate of development cannot be predicted accurately, further increases in per capita use for many of the well established frozen foods can be expected as well as increases that will result from population growth.

"Potential expansion is seen among the many families that now buy little or no frozen foods, as well as from anticipated rises in real income, further improvements in quality of frozen foods and the growing popularity of convenience foods among homemakers. All these factors add up to more buyers for many frozen foods and larger purchases by present buyers."

Orange juice concentrate has accounted for much of the growth in the frozen food industry. Although this product may be past its peak rate of growth the proportion of the orange crop used for frozen concentrated juice—about 40 percent in 1954-55—is likely to continue to increase.

Heat Pump Temperature Control Keeps Large Shopping Center Cooled and Warmed

THE new twenty million dollar Southdale Regional Shopping Center in suburban Minneapolis, operated by the Dayton Department Store, is one of the few shopping centers to plan a blight-proof neighborhood around itself. In its design, town planning principles were applied to fashion a new and strictly modern shopping center.

There are 72 stores in the Center which covers 82 acres. Adjacent is a 240-acre transition zone of office buildings, including a medical center; and a diversified residential area embracing 176 acres integrated with a natural lake and a public park. Each area is to have its own parking facilities and a green area separating it from its neighbor. Strategically located southwest of Minneapolis, in the heart of the prosperous fast-growing Edina-Richfield section, the shopping center itself is located at 66th Street and France in the village of Edina.

Southwest of Minneapolis in a growing residential section, a new shopping center has been established, with branch department stores and other shops catering to a wide range of buying needs. Besides offering a big line of consumer goods, from hardware to groceries, an appeal is made to the aesthetic senses in the Garden Court, and to the comfort of shoppers through temperature controls to keep the place comfortable during winter and summer weather.

The Dayton Store

With its 164 departments on three levels, the Dayton branch department store offers the same outstanding depth and breadth in merchandising as its parent store, the largest in Minneapolis. The basement level is devoted to a basement store, the lower level features home furnishings and housewares. This floor also contains a large mens' and boys' department. The upper level features ladies' fashions and children's wear. In spite of the size of the store, it will be easy to get around in it. Four escalators can move 32,000 people an hour and there is a passenger elevator.

In addition to offering a complete range of merchandise, there are restful dining facilities in the Valley View Room, which seats 200 people and boasts a colorful 41-foot long mural. The Dayton store also has its own auditorium, which may be used for meetings of civic groups and clubs of all types, as well as for lectures and fashion shows.

The Garden Court

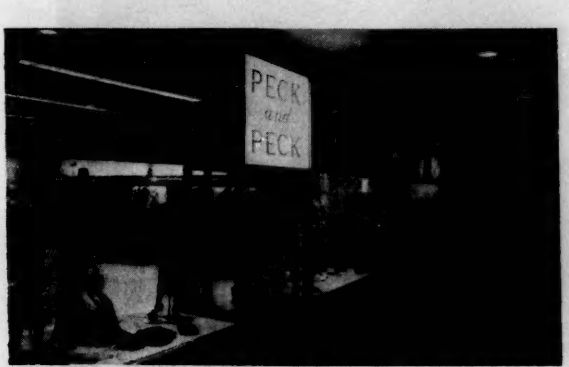
From Daytons the visitor may walk across the Garden Court to Donaldsons the second largest department store in Minneapolis. Donaldsons purchased outright 15 acres of Southdale for its own parking area and its branch store, which occupies 140,000 square feet.

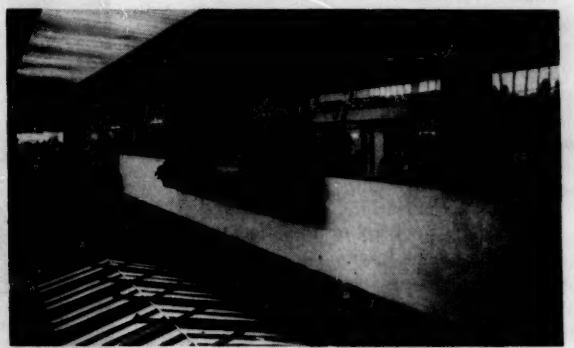
The plaza linking the two department stores is Southdale's Garden Court. Here the housewife can take a break on her round of errands. Sitting at the court's sidewalk cafe or on a rest bench, she can look at the semi-tropical plants and modern works of art, and listen to the 60 brightly plumed canaries, Japanese Robins and finches.

The court will features events of interest for everyone in the family: fashion and sport shows, seasonal flower displays and exhibits of everything from cars to paintings. And there is something extra special for the youngsters, a Disney-like fairyland; a minature zoo with live animals, rides, a papier mache jungle with giraffes, elephants and hippos staring out of the 3-D foliage. And, of course, plenty of dispensing machines for milk and orange drinks.

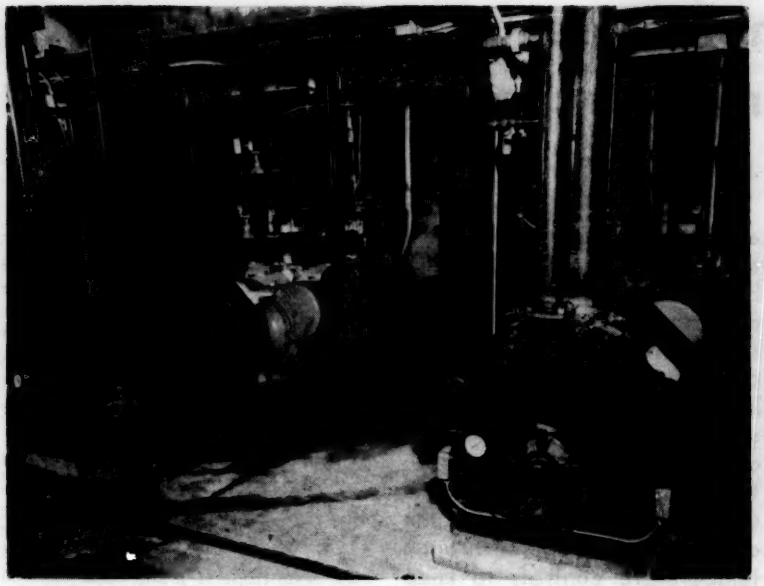
Heating and Cooling

The heavy mechanical equipment for heating and cooling is, for the most part, located in a penthouse





Fresh conditioned air from the garden court enters these lower level shops through louvres located above the show windows. Each of these shops contains its own package cooling unit. (Right) In summer this garden court is pre-cooled by 600 tons of refrigeration accomplished with 50 degree well water and through which the fresh air for the shops around the perimeter is supplied by louvres above the show windows. In winter, conditioned warm air is drawn into the shops from the mall through the same louvres. Each shop also has a packaged Yorkaire conditioning unit for cooling. Fresh air from the plenum, which extends the length of the garden court and is located directly behind the decorative vertical wooden panels, enters the mall through horizontal vents at the top of the panels but which cannot be seen from the garden court.



The compressor room at Southdale as it neared completion showing two of the five sixteen cylinder York V/W Freon-12 compressors direct connected to Minneapolis Moline natural gas engines. Gear reduction boxes step up speeds of compressors to 1½ times engine speeds (maximum 1200 rpm engine speed to 1800 rpm compressor speed). The system capacity is controlled by automatically varying the gas engine speeds.

above the roof of the main structure. The interior garden court is treated as an outdoor area and two supply fans located in the penthouse discharge a maximum of 120,000 cfm of air into this space from the outside. This outside air is pre-cooled during the summer time and preheated during the winter to maintain a temperature of 75 within the garden court.

Ventilation air to Dayton's Store is delivered from the garden court by separate fan located in the penthouse. Ventilation air for the other stores is provided by operation of six large fans located in the basement of the center. These fans exhaust air from the tenant stores which in turn induces fresh air from the garden court to enter the stores through long slots located above the store fronts. The air from the six basement exhaust fans is discharged into various stock room areas located in the basement level.

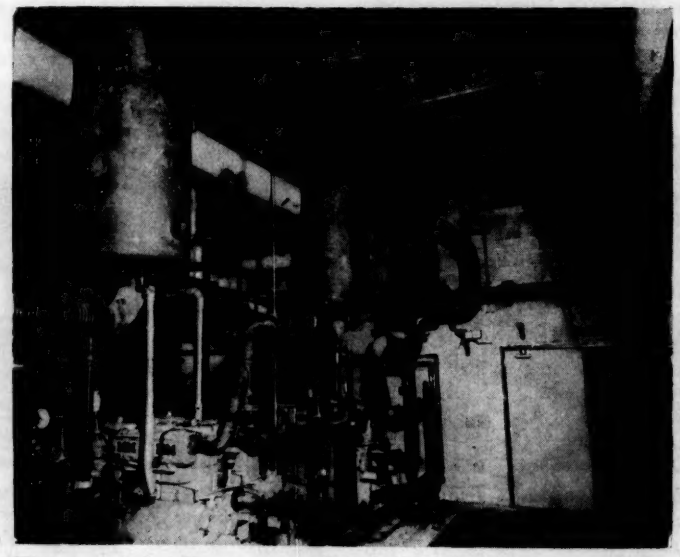
The basement level also contains a large truck tunnel which permits free loading and unloading merchandise both during active sales hours and when the shopping center is shut down. The air previously discharged into the basement stock areas is drawn into the truck tunnel and then exhausted by a single fan located in the penthouse. Differential static pressure regulators operating automatic dampers and inlet vanes on all fans insure the proper direction of air flow at all times.

Cooling for Dayton's Store is accomplished by a central chilled water refrigeration plant located in the penthouse, and having a capacity of 700 tons on the cooling cycle. This plant consists of five York 16 cylinder V/W Freon-12 compressors each direct connected to a Minneapolis-Moline natural gas internal combustion engine, plus two York 28 inch x 12 ft. condensers and two York 36 inch x 12 ft. flooded type water coolers. A recirculation water system distributes the chilled water from this plant to air units located within the interior of Dayton's Store.

Air conditioning for the remaining tenant stores in the center is provided by Yorkaire units ranging from 2 to 15 tons capacity. These package units have a total capacity of approximately 700 tons. Water cooled condensers are used in all package units and they are tied into a recirculation system which provides condenser water whether the unit operates or not. Well water at 50 F is used to pre-cool the total amount of outside air delivered into the garden court. Approximately 600 tons of refrigeration are accomplished with this water.

Major Heat Loads

During winter operation the two major heating load requirements are that of tempering the outside air introduced into the garden court and off-setting the transmission losses through the perimeter and roof of the total building structure. The heat for both of these purposes is supplied from the central refrigeration plant used to cool Dayton's Store. This system operates as a heat pump with the



Water cooled exhaust gas mufflers on these Minneapolis Moline natural gas engines, direct connected to the York compressors, remove heat from the engine exhaust to supplement the hot water from Southdale's heat pump system. This is a construction photo taken before heat exchangers and piping were installed.

heat rejected from the condensers being supplemented by heat from water cooled exhaust gas mufflers and virtually all the heat generated in the gas engine jackets.

A condenser water recirculation system delivers the heated water from the refrigeration heat pump to various air units with water coils located around the periphery of the project which offsets the perimeter heat losses. The hot water from the heat pump is also circulated through the well water cooling coils of the two large garden court supply units to provide a portion of the heat for ventilation air. To prevent freeze-up of these coils during sub-freezing outside temperatures, ethylene glycol preheat coils are located in the air streams preceding the water coils. The ethylene glycol also picks up heat from the water off the heat pump system through the use of a heat exchanger.

During winter operation of the heat pump cycle, the maximum condenser water temperature will be approximately 130 F. During extremely cold outside weather conditions, the capacity of this heat pump is not sufficient to heat the entire 120,000 cfm of ventilation air and the quantity of outside air introduced into the garden court is reduced during these periods.

Winter Cooling Conditions

Outside air is not used for cooling any of the stores during winter operation and the mechanical refrigeration system must serve this purpose. Under these conditions, the heat pump serves to transfer the heat generated within the interior areas of the Daytons Store to heat the ventilation air and off-set perimeter heat losses. The compressors of the heat pump must operate at a capacity necessary to satisfy the condition requiring the greater load whether it be the interior cooling for Dayton's Store or ventilation and perimeter heating loads. During these periods 52 F well water is bled into the refrigeration system water coolers to produce an artificial load if the heating requirements are greater than the cooling requirements. If the cooling requirements are greater, then the 52 F well water is bled into the refrigeration condensers to dissipate the surplus heat of rejection. Provision has also been made to utilize the condenser heat from the package units of tenant stores whenever it is available.

The central refrigeration heat pump system is very efficient in comparison to the operation of a boiler.

Outside air is introduced into the distribution plenum through the large opening at upper right. Air is channeled into the garden court beneath the court's ceiling through horizontal vents above the vertical wooden decorative paneling in the court.

At minus 20 F. outside temperature this heat pump will make available for heating 1.37 Btu of heat energy for every Btu of energy supplied to the gas engines in the form of natural gas. For minus 10 F. the efficiency is slightly improved and the heat pump will produce 1.45 Btu of heat energy for each Btu of energy supplied to the gas engines. This compares with a maximum output of 0.8 heat energy available from a boiler for every Btu of natural gas supplied to the burners. However, pumping costs must be evaluated in the heat pump performance since they are considerably more than would be expected with boiler plant operation.

Donaldson's Second Largest

The second largest store is Donaldson's Department Store, having a total area of approximately 160,000 sq. ft. Although Donaldsons is completely integrated with the shopping center in an architectural sense, it is in all other respects independent, including mechanical ventilation, air conditioning and heating systems, which are separate from the balance of the shopping center.

Fresh air supply ducts have been eliminated by using the enclosed three-story Garden Court as a giant air plenum providing primary summer cooling and winter heating for the Center.

All compressors, chillers, condensors, engines and other equipment in the main penthouse refrigeration system were supplied by the York Corporation, which also furnished the tenant package units with an aggregate capacity of about 600 tons. There are also 31 McQuay "HC" units along the exterior walls with a combined capacity of 5,000,000 Btu for perimeter heating. Two Westinghouse fans rated at 60,000 cfm push conditioned air into the Garden Court, the indoor plaza around which the tenant stores are clustered.

Western Air Conditioning Conference and Exhibit

THE FIRST Western Air Conditioning, Heating, Ventilating & Refrigeration Conference and Exhibit has been scheduled for May 3-7, 1957, according to Arthur J. Hess, Chairman of the show's Executive Committee, and Regional Chairman of the American Society of Air Conditioning and Heating Engineers.

This regional exhibit program will be held simultaneously with the Regional Conference of the ASHAE. Other engineering societies and contractors' groups are expected to participate in the informative technical sessions.

"A regional show of this type is long overdue and is bound to give an immense stimulus to all branches of the air-conditioning, heating, ventilating, refrigeration and allied industries in the area, the fastest-growing market for such products and services in the United States," said Mr. Hess.

Attendance for three of the five days scheduled for the event will be restricted to those connected directly with the industry and the remaining two days will be open to the general public specifically interested in the type of equipment on display for their homes or small business establishments.

Fred J. Tabery, well-known exhibit manager, has been named to manage this regional event which is expected to draw from the 11 western states. Tabery has announced a concentrated publicity campaign directed to every type of user of the products which will comprise the exhibit.

The announcement was made at a meeting at the Shrine Exposition Hall in Los Angeles where the show will be held, attended by the executive committee of the program.

Corrosion Hits Refrigeration Systems In Supermarket and Shopping Centers

VULNERABILITY of expensive refrigeration equipment to serious corrosion damage should be a major cause for concern among supermarket operators, frozen food dealers and others who have large investments in such facilities, warns Henry L. Shuldener, president of Water Service Laboratories, Inc. In a recent release from his firm's Corrosion Research Exhibit, Shuldener indicated that the shopping center or supermarket operator is today perhaps the largest single loser to ravages of corrosion among the operators of this equipment.

Avoid Breakdowns

The importance of water conditioning in prolonging the life of water-conveying or water-employing equipment was long ago recognized by owners of office and apartment buildings, and by operators of hotels and other institutional structures. More recently it has achieved wide acceptance among air conditioning and refrigeration engineers and contractors as an effective method for minimizing corrosion-produced breakdowns in cooling systems, frozen food display cases and other refrigeration equipment. Actually the danger of a breakdown in a refrigeration system is potentially greater and more costly than a breakdown of a building's air conditioning or plumbing system.

To understand more easily the reasons for the greater damage potential in refrigeration equipment, it is helpful to know how water acquires its corrosive characteristics. Water is made corrosive by gases, primarily oxygen and carbon dioxide, which it absorbs from contact with the atmosphere. Water used in cooling towers and evaporative condensers of air conditioning and refrigeration systems is, therefore, especially dangerous because it is repeatedly exposed to these gases as it is sprayed through the atmosphere. The absorption of sulphur dioxide or other corrosive impurities which may be present in urban areas will increase the danger of corrosion damage. Unless corrective treatment of such water is applied, eventual damage to the water-contacted equipment is inevitable. Such damage can be in the form of clogging of spray nozzle apertures, leaky pipes, perforated eliminator plates and destruction of copper condenser tubes. Breakdowns, water experts point out, are likely to occur during the period of heaviest load — the time when the equipment is most needed.

Threat of Food Spoilage

Repair of corrosion damage to any piece of equipment is expensive. However, the user of refrigeration equipment also faces the almost certain additional cost of food spoilage in the event of an equipment breakdown. This double jeopardy situation is in sharp contrast to the temporary inconvenience caused by a loss of comfort cooling, Shuldener emphasizes.

Furthermore, although water-produced corrosion problems are the same in air conditioning and refrigeration systems, the susceptibility of the latter to damage and breakdown is far greater than it is in comfort cooling systems. The reason for this is simple. Air cooling facilities in most parts of the country operate only in the summer months, and during business hours. Refrigeration units, on the other hand are "on the line" 24 hours a day, all year 'round. Water Service Laboratories engineers estimate that refrigeration systems run about five times as much as comfort units, thus accelerating the corrosive process to a marked degree.

A permanent Corrosion Research Exhibit at Water Service Laboratories' main office, New York City, which has collected dozens of examples (see Fig. 1) of short term serious damage supports Mr. Shuldener's contention. A galvanized iron pipe that failed because of corrosion

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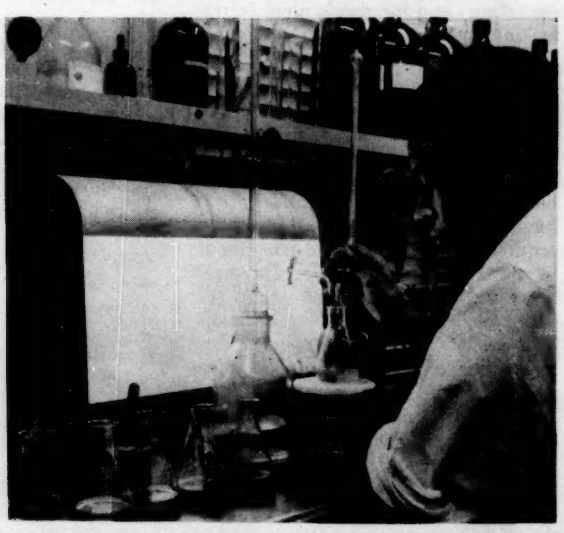

Fig. 1 (Left) Henry L. Shuldener, right, president of Water Service Laboratories, and Dr. Sidney Sussman, the firm's chief chemist, examine part of an aluminum eliminator plate perforated by corrosion. Such damage to refrigeration and air conditioning parts can cripple a cooling system in a matter of months. In the background is Water Service Laboratories' Corrosion Research Exhibit which has on display numerous examples of short term damage to equipment taken from systems actually in use in the field. Fig. 2 (Right) Research by water treating organizations has resulted in valuable contributions in the fight against water-produced corrosion. Here, a technician analyzes water samples brought in from the field so that proper treatment can be prescribed.

Trends in Transit Cooling

HAROLD D. JOHNSON
Marketing Research Division
U.S. Dept. of Agriculture

THE FUTURE of your industry, in terms of ice production, is closely related and dependent upon methods of food processing and the type of transportation equipment used in distributing our perishable foods production. We are advised that the population of the United States at the present time is over 168,000,000 people. Five years ago, it was 150,000,000. This increase has brought a tremendous increase in demand for food, but in addition, the number of families with annual incomes in excess of $5,000 has tripled in the last 10 years. Some 40 percent of our families fall in this classification. So, we have not only a demand for more food, but an increased demand for specialty foods that must have special protection to protect and preserve their inherent quality during transportation and marketing. The satisfaction of these demands is revolutionizing methods of food production, marketing, and processing, and the transportation industry.

Hydrocooling Offers Big Possibilities

Specialty farming operation today supplies the greater part of our perishable fruit, vegetable, meat and dairy production. Research has indicated the advantages of precooling many fruits and vegetables before shipment, and this opened a broad new market for your industry — hydrocooling. In large part, ice has been used to keep the commodities cool from production origin to processing plants and on to consumers. The ice bunker car has been the standard in perishable transportation, with trucks playing a relatively minor role until recent years. The fresh fruit, vegetable, and meat markets were the retail outlets for our everyday food requirements. Keep this picture in mind because it is in sharp contrast to what we find today, just 10 years later.

In our modern supermarkets, the customer faces long rows of mechanically refrigerated display cabinets where she can purchase frozen baked goods, meats, soups, fruits, vegetables, fish, poultry, concentrated milk, and fruit juices; yes, even complete dinners, precooked, ready to serve after thawing and heating. The fresh fruit and vegetable counter is still there, but it no longer occupies the prominent position it once had, nor is it as extensive. The meat counter where roasts were boned, hams were sliced, and beef was ground to the customer's specifications, has virtually disappeared. Prepared packages of fresh meat are now the general rule. The fresh fish display is relegated to a far corner of the store and the fish are packaged. Fresh poultry also is packaged. While canned juices still occupy considerable shelf space, the trend definitely is toward the concentrates.

Paper presented at Annual Convention National Association of Ice Industries, November 16, 1956.

Ice in Transportation

How has this revolution affected the transportation industry? What is the future for ice in transportation? Perhaps first we should review the existing situation in terms of perishables traffic requiring transportation and the equipment on hand to transport it. Estimated annual perishables food traffic requiring refrigeration, excluding milk and ice cream, now totals some 30 million tons. This is made up as follows: 14,000,000 tons of fresh fruits and vegetables; 2,500,000 tons of frozen foods; and 13,500,000 tons of animal, poultry, dairy, and confectionery products. The railroads' share of this traffic totals some 12 million tons, and trucks handle an estimated 18 million tons. This is a 40-60 percent ratio.

Of particular interest to you, perhaps, are actual traffic figures on food perishables requiring refrigeration as moved by the railroads, predominantly in ice-bunker cars. Class I railroad fresh fruit and vegetable traffic has declined from 7½ million tons in 1948 to less than 5½ million tons in 1955. Similarly, rail traffic in fresh meats, dairy products (other than milk and ice cream), poultry, fish, and confectionery products declined from 6 million tons to less than 5½ million tons. These declines have occurred when total population and food consumption per capita have been increasing. Only in frozen foods, has Class I rail traffic shown an increase, from 620,000 tons in 1948 to 940,000 tons in 1955. And, this latter rail traffic for the most part is, or will be, handled in mechanical refrigerated cars.

Specific and comprehensive traffic data for motor trucks are not available but studies in limited areas indicate a large refrigerated perishable foods movement by truck. In New York City, the percentage of motor carrier unloads of apples has increased from 62 percent in 1939 to 80 percent in 1955; grapefruit and orange unloads in 1939 were practically all from rail cars, but in 1955 truck unloads accounted for 24 percent and 19 percent of these commodities; and for tomatoes, truck unloads now are 61 percent as compared to 48 percent in 1939. For Chicago, unloads of oranges from motor trucks now constitute 28 percent, whereas in 1941, the figure was four percent; truck unloads of grapefruit have increased from practically none in 1939 to some 48 percent of the 1955 total; tomato unloads by truck are now 54 percent of the total compared to 16 percent in 1939, but apple unloads have remained stationary at around 40 to 45 percent since 1940.

Perishables by Truck

A survey of 21 larger cities in the United States reveals that truck unloads of selected fruits and vegetables increased from 241,000 in 1952 to 290,000 in 1955. Probably 50 to 55 percent of this volume requires transit refrigeration. It is estimated that the motor truck movement of perishable fruits and vegetables requiring refrigeration now aggregates over nine million tons annually, whereas in 1951, this total was about six million tons. Approximately 70 percent of frozen food moves by truck and total volume has tripled since 1948.

It would appear that on the basis of the above traffic data, limited as it is, the motor carrier is securing a greater proportion of the total traffic in perishable fresh foods requiring refrigeration. Too, it is evident that frozen foods traffic has shown tremendous gains in recent years, and the motor carriers are getting the larger share of this traffic.

These facts are reflected in the number and type of refrigerated vehicles now being used in the trade. The number of RS type cars, or those generally used in moving perishable foods requiring ice refrigeration, has declined from about 114,000 in 1948 to a little over 100,000 in 1955, and it is believed this figure

will remain about stationary for some time to come. Over the same period, the number equipped with fans has increased from 19,000 to 67,000, reflecting the railroads' desire to supply the most efficient refrigerating operation possible in the ice reefer car.

The number of mechanical cars—the RP type—has increased from three in 1948 to about 2,100 at the present time, and these are being used for the most part in frozen food traffic. Actually, the number in service more than tripled between 1955 and 1956, and this is a good indication that the rail lines expect a considerably increased movement of frozen foods requiring maintenance of zero F temperature, or below. A recent test of reefer cars points up the necessity of using mechanically refrigerated cars where zero F commodity temperatures are to be maintained.

30,000 Refrigerated Trucks

Estimates of the number of refrigerated motor truck trailers on our highways run as high as 30,000. However, there is not any breakdown of this figure between mechanically refrigerated and wet ice in which we have confidence. It is a reasonable conclusion, I believe, that the preponderance of trailers is mechanically refrigerated and that a large percentage of these are designed for handling fresh perishable foods at temperatures of 40 F or above. Possibly less than 10,000 trailers are regularly engaged in the frozen food trade where temperature requirements are quite rigid.

Some of these use dry ice. A large percentage of them are mechanically refrigerated, and many are generally inadequate in that they will not maintain in-transit zero F commodity temperatures, as revealed by impartial tests we have conducted. However, the fleet is expanding rapidly, with estimates of yearly production running as high as 5,500 mechanically refrigerated van units, again reflecting a degree of confidence in frozen food growth as well as the motor carrier's confidence in the potential perishable food traffic.

While both the railroads and motor carriers have confidence in the future for expanded movement of perishable foods requiring refrigeration, the degree to which each participates in this traffic is of significance to your industry. I believe we can rightly assume that shipment by rail of fresh perishable foods over comparable distances requires more ice than similar shipments of the same volume by truck, first because rail shipment is slower than truck, and second, because rail bunkers hold much larger quantities of ice than do trailer vans.

Statistics indicate the average loads per rail bunker car and per trailer van are about the same, or 15 tons of cargo. Assuming that both rail car and trailer are equipped with fans, each should provide adequate protection to the product. With the increasing use of trucks in hauling these fresh perishables, a decreased ice consumption would be indicated. However, this will be partially offset by the generally higher price received from truckers for ice, so that income from the transport ice market may not be materially reduced. The extensive use of slingers and snow ice has brought economies in ice handling.

Antibiotic Ice

A development that may have a significant bearing on the future market for transport ice is the use of antibiotics in retarding the action of bacteria which cause food spoilage. The market for dressed poultry is growing by leaps and bounds. A recent study reveals that in 12 of our larger cities, dressed poultry receipts have advanced from over 780 million pounds in 1952 to 835 million pounds in 1955. Much of this is transported under ice refrigeration and the Food and Drug Administration approved use of aureomycin on poultry, is a factor in this increase. By extending the period in which the poultry can be safely merchandised, the area in which it finds a market can be expanded with resulting increased transportation.

Antibiotic ice is being used on ships for extending the merchandisable life of fresh fish, also expanding the area in which fresh fish can be marketed. Already, antibiotics are being used on other perishable foods in several countries, and research, both public and private, now under way in this country may find this treatment acceptable for many of our everyday food items which are not cooked before being consumed. The present criteria that seems to determine whether or not it will be approved by our Food and Drug Administration, is a determination that no trace of it remains after the product is cooked. Should broader approval be forthcoming it would conceivably increase the demand for fresh fruits, vegetables, meats, etc., and to some degree show up the trend to frozen foods. Shipment of any perishable food so treated still would require refrigeration, and the ice industry may then have access to a greatly enlarged market.

The developing piggyback operations also have a direct bearing on ice consumption for transportation. Here, loaded refrigerated trailers or van bodies move from shipper to railroad sidings and are hauled on railroad flat cars in fast service to distribution cities, where the trailer is moved by a tractor to the consignee's door. Trucker savings accrue since rail rates for this service are low and the consignee benefits through fast service.

While this transportation innovation probably has not reaped much fresh perishable foods traffic during its developmental stage, it probably will over a period of time. If this is the case, due to inadequate sources of ice along rail routes for servicing the low ice capacity trailers and delays incurred in icing, dry ice or mechanically refrigerated trailers probably will be used. The former would have to incorporate a thermostat control to prevent freezing, and the latter would necessitate the provision of adequate refrigerating unit servicing facilities along rail routes, together with provision for humidity control so necessary in the movement of many fresh fruits and vegetables. It is believed all of these can be provided. Perhaps here is a challenge to the ice industry to promote the development of a refrigerated van body using ice, for use in piggyback operations.

Increased Population and Income Favorable Factors

Our increasing population virtually guarantees a market for all the fresh fruits, vegetables, and other perishable foods requiring refrigeration. The increasing number of families in the $5,000 or above annual income bracket will bring about further increased demand for specialty foods, incorporating top quality and convenience. Packaged foods, including frozen foods, will make up an increasing proportion of our everyday food demands. Frozen food growth will continue at a rapid pace, but other methods of food preservation may slow the rate of growth.

The increased use of antibiotics in perishable foods preservation, when and if officially approved, will increase the demand for fresh perishable foods and will result in a greater proportion of refrigerated transportation under ice. The use of high speed ice-bunker cars will expand, as

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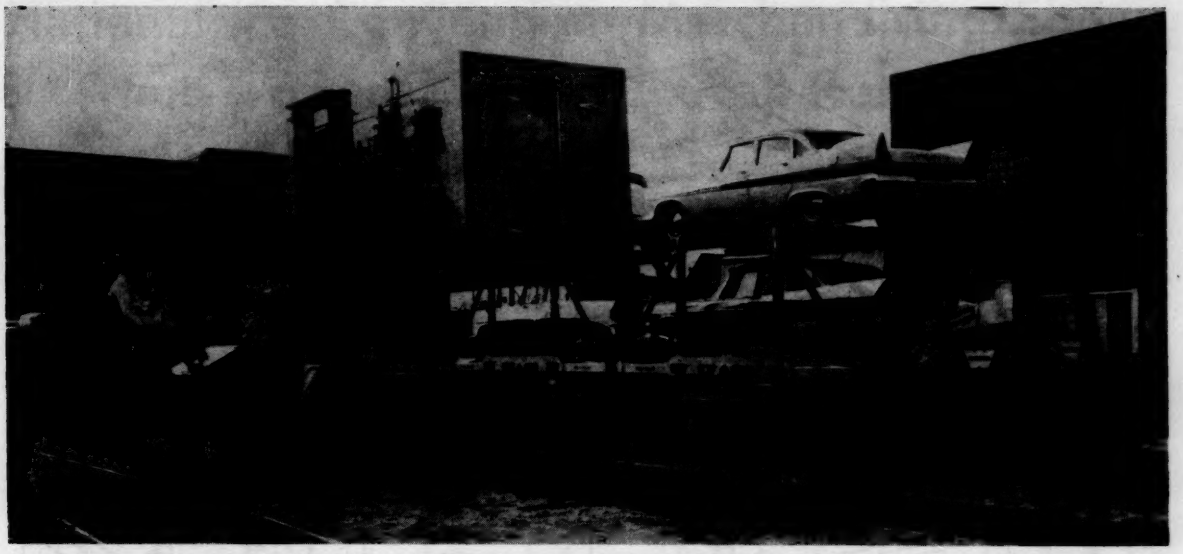


A refrigerated container is lifted from a flat car to a truck trailer in the Rock Island's "Convert-A-Frate" service.

New Refrigerated Unit For Small Freight Shipments

A NEW Cargo unit called "Convert-A-Frate" which can be used for small refrigerated shipments, has been introduced by the Rock Island Railroad. The new unit is a portable rectangular box mounted on a flatcar which can be "switched" with the aid of a fork lift truck from flatcar to truck-hauled flatbed trailer, thus making a single uninterrupted trip from shipper to receiver. It is made of Scotchply brand reinforced plastic. The whole "Convert-A-Frate" concept is one of an expedited and flexible service, designed to meet truck competition, either on short or long hauls.

Recently the Rock Island displayed its new method and handling less than carload freight movements before more than 500 shippers and railroad executives at Chicago. The containers are made to handle a variety of shipments, ranging from special boxes for merchandise to more specialized types, such as covered hoppers for dry bulk materials and a refrigerated unit for perishables.

Refrigerated Unit

The star of the show was a 17-foot refrigerated cargo unit used for the transportation of perishable and frozen foods. This unit is the result of joint research conducted by Rock Island's research and development department and engineers of the Minnesota Mining and Manufacturing Company. The refrigerator unit was assembled by the Rock Island at its 49th Street Shops. The others were manufactured by ACF Industries, Inc.

The kind of refrigeration used in this unit initially is dry ice. The dry ice is stored in a separate bunker in the front end of the cargo unit which is thermostatically controlled. The principle of the refrigeration is cold air from the dry ice circulating around the produce. Specifications of this unit, which is illustrated with this article are as follows: Capacity, 686 cu. ft.; weight (light), 6000 lbs.; weight (max. gross), 35,000 lbs.; inside height, 6 ft 7¾ in; inside width, 6 ft 7⅜ in; inside length, 15 ft 9⅝ in; small side door, width, 17¼ in, height, 4 ft ¾ in; large side door, width 3 ft, height 6 ft 2 in; double end door, width, 4 ft 2 in, height, 6 ft 2 in.

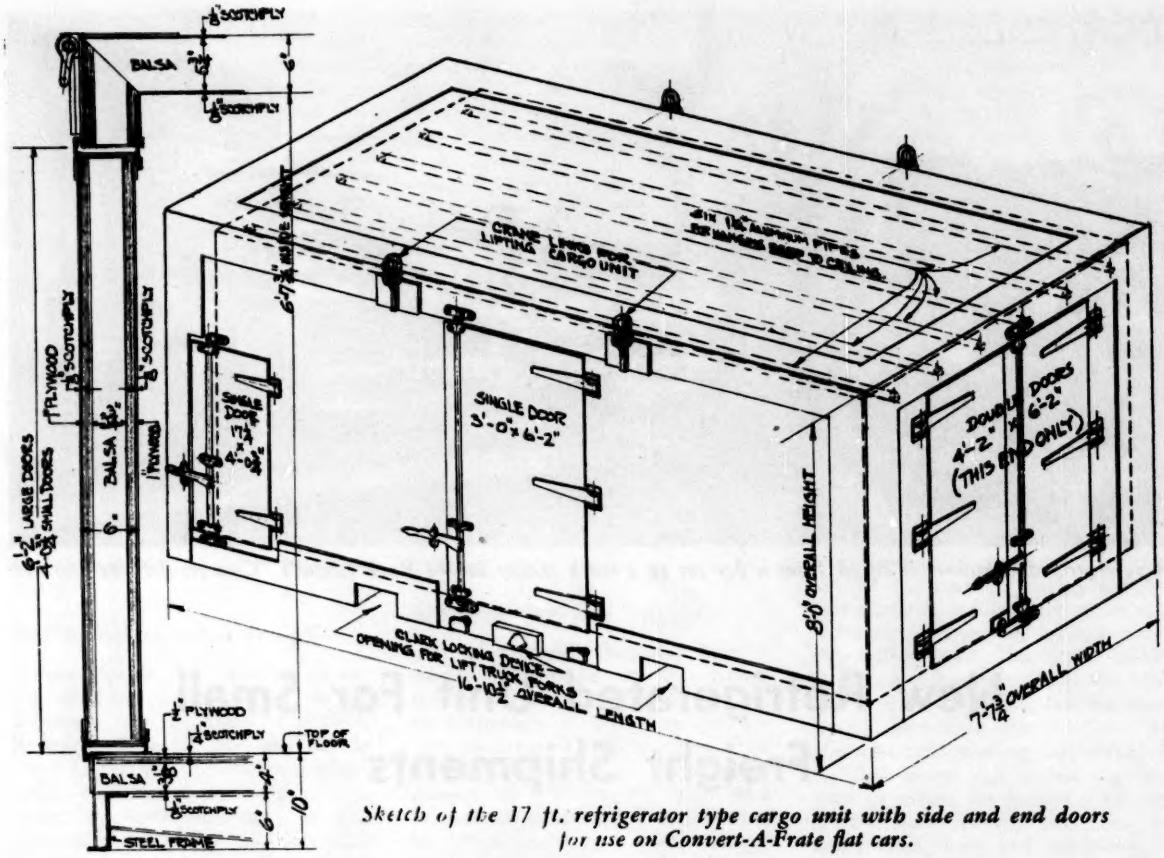
Heart of the Rock Islands' new "Convert-A-Frate" service is a 38-foot flat car with only four wheels. It is equipped with roller bearings and highspeed brakes.

The Containers

The containers are 8 feet wide and 8 feet high and can be 8, 17 or 35 feet long. In construction they are merely an over-sized, enclosed pallet, having slots in their floors to take the forks of a lift truck. A huge fork-lift truck can quickly move the containers from the flat car to a flat bed truck trailer for transportation from the rail terminal to destination. Anchors set into the flat car floor fit into wedge-shaped openings in the container's bottom, preventing the load from shifting in transit.

After the cargo units are loaded they are taken to the flatcar which then becomes a part of a regular freight train for transportation to the destination area. Upon arrival, the units are lifted from the flatcar and carried from the yards directly to the consignee's place of business where they are unloaded. Units are then returned, empty or loaded, to the flatcar.

With this service the railroad will be able to service industry regardless of location. Industries formerly not accessible to railroad rights-of-way can now take advantage of economical freight hauling through the use of "Convert-A-Frate service."


BALSA
SINGLE DOOR 3'-0" x 6'-2"
DOUBLE DOORS 4'-2" x 6'-2" (THIS END ONLY)
8'-0" OVERALL HEIGHT
7'-3 3/4" OVERALL WIDTH
16'-10 1/2" OVERALL LENGTH
CLEAR LOCKING DEVICE OPENINGS FOR LIFT TRUCK FORKS
TOP OF FLOOR
STEEL FRAME

Sketch of the 17 ft. refrigerator type cargo unit with side and end doors for use on Convert-A-Frate flat cars.

This versatile service also means that shippers no longer need worry about the availability of "specialized" freight cars. The basic flatcar unit with the demountable bodies "tailors" the car to suit the cargo of the shipper within a matter of minutes.

As the service becomes amplified and its operation more widespread, cargo units may ultimately be moved by conveyor, roller or other means.

The Rock Island estimates the cost of its "Convert-A-Frate" service equipment at only about half that of conventional flat cars and highway trailers. A flat car and two containers will cost about $5,000. The big fork-lift truck costs about $20,000.

The road now has about 20 of the initial 50 flat cars ordered. These are being used principally for shipment of steel to consumers in the Rock Is-

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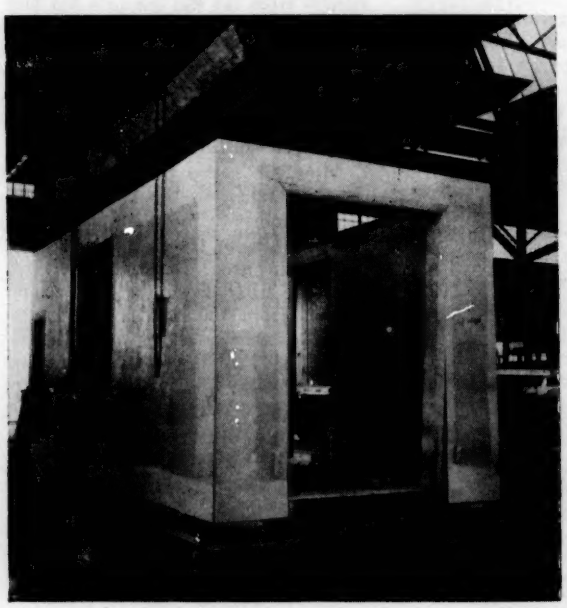
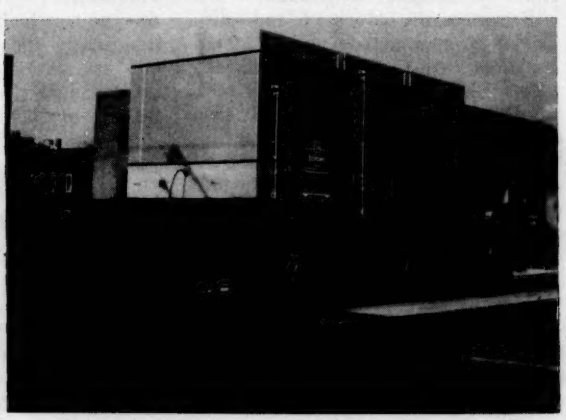


(Left) Top of "Convert-A-Frate" refrigerated cargo unit is lowered into place. Shown are ceiling racks for hanging of meat.

(Below) Cargo unit in position on flat car. In practice, two such units will be loaded on each car.



National Ice Convention—Merchandising Shows Trend Toward Selling Ice at Retail Level

WITH a registration of over 500, the thirty-ninth annual convention of the National Association of Ice Industries was held at the Atlanta Biltmore Hotel, November 13-16. With an interesting and informative program each session was well attended throughout from the opening Tuesday afternoon until the close of the convention Friday noon.

The theme of the convention, as announced previously, was merchandising in its various phases, and to back up this program the exhibits were for the most part equipment and supplies designed for the specific purpose of selling more ice. Among the talks and papers specially directed toward selling were the psychology of selling, producing and merchandising processed ice, meeting changed marketing conditions, truck icing, the small dealer, and trends in transit cooling.

Probably the outstanding fact uppermost in the program was the recognition that conditions are changing and that the ice man is duty bound to do something to meet these changing conditions. At the present time, offering ice for sale at the retail level seems to offer the most effective opportunity to accomplish that result. This was borne out by the comments, either directly or indirectly of most of the speakers.

The entertainment features included a luncheon and tour of Atlanta for the ladies on Tuesday; a coffee hour at an Atlanta department store Wednesday; a sight-seeing trip to scenic spots of Atlanta, and a Southern Barbecue Wednesday afternoon and evening; and the annual president's dinner dance and entertainment Thursday evening.

Officers Elected

Following the custom of previous years all the officers of the Association were re-elected for another term of one year, as follows:

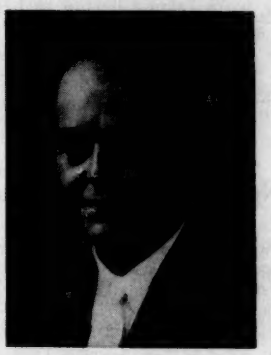
President, E. L. Gunn, Jr., Atlanta, Ga.
First Vice-president, Richard C. Muckermann, St. Louis, Mo.
Second Vice-president, Paul W. Easton, Los Angeles, Calif.
Treasurer, George W. Steers, Jr., Kalamazoo, Mich.
Executive Secretary, Guy W. Jacobs, Washington, D.C.

Board of Directors Report

At the final session, a brief report was made by President Gunn on the meeting of the Board of Directors. A budget for 1957 was adopted for action of the Executive Committee which will meet in January. The dues for 1957 will remain as previously. The 1957 convention will be held at the Statler Hotel, Detroit, November 12-15.

President's Address

At the opening session Tuesday afternoon, E. L. Gunn, President, gave a brief survey of conditions in the ice industry. Although tonnage sales are down, he said, the dollar volume because of better prices for prepared ice, remains fairly constant.



E. L. Gunn, Jr., President N A I I

More and more, he pointed out, ice men are recognizing that conditions are changing and a measure of their future success will be in the way they make changes to meet these new conditions. This holds true in all sections of the country, but with a variation of methods to meet differing conditions.

On the financial side, he strongly urged that continued deficit operation, as pointed out in the Treasurer's report, is unsound and that the association must get back to living within the budget. As a means toward this end he suggested a change in the basis of dues from a tonnage to a dollar sales basis.

Executive Secretary Reports

The first speaker at the opening session was Guy W. Jacobs, executive-Secretary. Mr. Jacobs called attention to these exhibitors who had their wares displayed in an adjoining room. In these changing times, he said, ice men need new tools and ways for selling ice and in these exhibits would be found these new tools and methods. He dwelt briefly on the work of the association including various department activities, such as sales surveys, collection of information on the ice business of value to members, and various publicity plans. With these and other helps that are available, he concluded, the ice man can make his future secure, thus choosing between success and failure.

Treasurer Reports

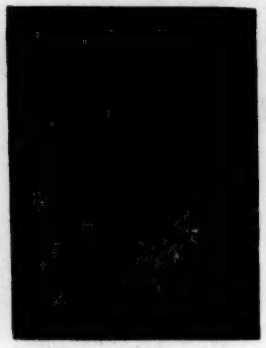
George Steers in his report as treasurer, said the finances of the association are less than satisfactory, in that expenditures again were more than receipts. Although the association has a backlog of investments, such deficit financing is not healthy and this backlog will not last indefinitely. He urged that steps be taken immediately to get expenses within the budget by changing the dues setup and thus increasing the revenue. It is either that, he said, or curtailing services, and this would be a backward move.

Exhibitors Introduced

Calling attention to the exhibitors at the convention, Milton E. McLain, Buford, Ga., said ideas and methods are changing and that these exhibitors were showing new equipment and supplies, designed to implement these new ideas and methods all for the purpose of building a better ice business.

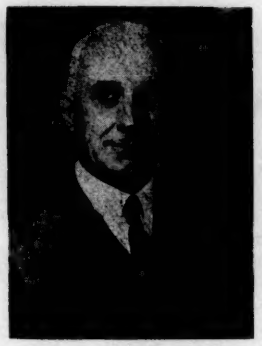
You and Your Government

An interesting and enlightening talk was given by Graham A. Barden, Chairman of the Education and Labor Committee of the U. S. House of Representatives. Mr. Barden was one of a number of featured outside speakers. He said members of the convention and every other voter in America have a vital responsibility in the kind of government we have. Voters, he said should make their ideas and opinions known to members of Congress who will be very receptive to any such information. He touched on the vital necessity of

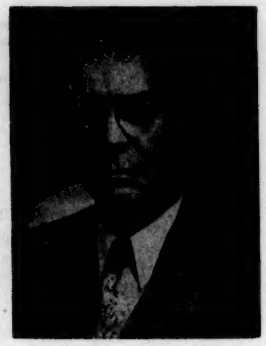


Richard C. Muckerman, Vice-president N A I I

Paul W. Easton Vice-president N A I I



George Steers Jr., Treasurer N A I I



Guy W. Jacobs, Exec-Secy N A I I

holding the line between states rights and encroachment of the federal government on those rights. The interests of management, labor, and the public are inseparable, and the closer a government is to the people the better that government will be, he said. An attempt will be made in the next Congress either to repeal outright, or to amend beyond recognition the Taft-Hartly Act.

The Business Outlook

An interesting and factual report on the business outlook for 1957 was presented by L. B. Raisty, vice-president, Federal Reserve Bank, Atlanta, Ga. Mr. Raisty said there is a growing belief among business men and economists that the year 1957 will continue as another boom year and that business interests can plan for normal expansion with confidence.

Among the favorable indications in the economic picture are that sales of goods are now breaking all records and the total output of manufactured goods is the highest it has ever been. Prices continue to move upward, but these increases so far have been moderate, and have not seemed to affect sales. Among the signs of an expanding economy is the fact that in recent years a huge market has developed.

Controlling Inflation

There are, however factors which will tend to react against runaway inflation, which the Federal Reserve is watching very closely. One of these is the recent raising of the discount rate. Another is the fact that automobile sales are down and are not expected to retain their former high point. There is also a decrease in home building. Federal government spending, notably for defense and road building and increased spending by states and cities all are expected to have an inflationary effect.

Push Button Ice Selling

One of the interesting reports by a practical ice man was by H. I. Dithmer on the operation of a one-man semi-automatic ice making plant. Mr. Dithmer described this process which he had installed by which one man working one shift with the help of automatic equipment and controls does all the operating work from freezing to harvesting and packaging, making it possible to leave the plant unattended over night. Automatic scoring and processed ice machines are used as well as other automatic processes wherever possible. Records which Mr. Dithmer quoted showed for this year a considerable increase in tons per hour production over last year.

Ways of Making Profits

There are two important steps in making a profit in the ice business, according to K. F. Addison, City Ice Co., Tulsa, Okla. The first is to create a retail market for processed ice, and the second is to produce it as economically as possible. Following this policy, his company has established outlets for ice through vending machines at gas stations and ice

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merchandisers in supermarkets and others. The company now has 40 outlets, of which 10 are vending stations and 18 are ice merchandisers. The costs of processing and bagging is $1.09 per ton. Deliveries of fresh supplies to those outlets are made on a call basis only. Following his talk Mr. Addison showed a moving picture of the operation from processing to delivery.

Changing Markets

Coping with the industry's changing markets, according to A. J. Gordon, Atlantic Company, Atlanta, Ga., is primarily a sales problem, but it also involves a close watch on costs and personnel and other aspects of ordinary business. The manufacture and selling of ice is still a good business and still has possibilities of growth, he said. The chief effort of meeting today's problems must be along the line of selling more ice and this is essentially that of making processed ice and making it available to customers.

L. L. Belcher, Mountain Ice & Coal Company, Pueblo, Colo., talked on the same subject. Failure to recognize changing conditions in the ice business, he said, cannot help but result in declining business. During the period of adjustment to new conditions, the industry has lost, due mostly to a lack of aggressiveness. There's nothing wrong with the ice business today that sales will not cure, and the ice man who fails to keep in step has only himself to blame because there is a wealth of information available on this subject.

O. T. Clark, Jr., Riverside Ice Co., Ft. Worth, Texas, also talked on this subject, telling what his company is doing in selling packaged ice. Other companies selling consumer goods, he said, do not hesitate to spend money to broaden their market and those in the ice business should do likewise. His company has covered the sales area with retail outlets chiefly through supermarkets and smaller neighborhood food stores. Instead of trying to sell a large amount at a few locations their aim in this is to spread the market into all possible places where ice can be sold. The result has been very satisfactory. Mr. Clark then showed a number of slides showing details of the ice processing and many locations where their ice is being sold.

David J. Copeland, American Service Company, Atlanta, Ga., spoke briefly on the necessity of using local advertising. As an example of effective advertising he demonstrated a small poster designed for display at the check-out counter of supermarkets, calling attention to the fact that ice is for sale in the store. Many people, he said, pass by the ice counter without realizing it is there and such a counter card will serve as an effective reminder.

The Value of Conscience

The constant upgrading of the social conscience of business interests was the theme of a talk by A. Boyd Campbell, Chamber of Commerce of the United States. Trade associations in America are growing in both number and prestige, he said, and this is a healthy sign in American life because they set a high standard of business ethics.

Truck Icing

An interesting and practical talk on building a truck icing business was given by Gilbert P. Bush, Gallipolis Ice Company, Gallipolis, Ohio. Mr. Bush said his town had a population of only about 10,000. And yet this year his truck icing business will amount to serving some 2,000 trucks and sales of about $15,000 worth of ice, all this in addition to the regular business.

Mr. Bush described the initiation of his business, with a used ensilage cutter and blower which was surprisingly successful. Later a crusher blower was installed. To build this business, he has made trips to Florida and back, following established truck routes and leaving posters and cards at stops along the way. He had made a point of providing quality service, and this he believes has been a valuable feature of building the business.

Trends in Transit Cooling

Harold D. Johnson, U. S. Dept. of Agriculture, covered a wide range of transit cooling, including refrigerator cars and trucks. Refrigerated shipments of fresh fruits and vegetables and meat products have been declining, he said, but frozen food shipments have largely made up the difference. Another change in the picture is that truck shipments are increasing. The use of mechanically refrigerated cars is increasing largely because of the temperature requirements of frozen foods, but ice refrigerator cars still have a very important place.

The Small Dealer Dilemma

How his company, the Central Dairy Products Co., Winfield, Kansas, met a problem of the small dealers, was told by C. R. McCarter. Early in 1955 they decided that the price the company was getting for ice, 35 cents per 100 lbs. delivered to the dealers was not enough. So they changed over to processed ice and only one 12½ pound block ice. The dealers welcomed this change as providing a better product and more profit for them. Many dealers who had previously discontinued selling ice were glad to return to the business. The net result has been increased retail sales and improved revenue for the company.

The Exhibitors

Following recent trends, the exhibits at this convention were pointed largely toward equipment and supplies designed for the purpose of selling more ice through modern vending machines, ice merchandising cabinets, advertising materials and others. The following exhibitors were represented:

Ballard Sales Company, Fort Worth, Texas.
Bateman Foundry & Machine Co., Inc., Mineral Wells, Texas.
Birmingham Stove & Range Co., Birmingham, Alabama.
K. G. Brown Mfg. Co., Inc., Mattituck, L. I., New York.
J. P. Carlisle Co., Greensboro, N. C.
Chemical Solvent Company, Birmingham, Ala.
F. B. Dickinson & Co., Des Moines, Iowa.
Dave Fischbein Company, Minneapolis, Minn.
Frick Company, Waynesboro, Penna.
Gifford-Wood Co., Hudson, N. Y.
Hall Machine Works, New Smyrna Beach, Fla.
Ice Carvings Company, Hollywood, Calif.
Ice Plant Equipment Company, Inc., Philadelphia, Pa.
Index Coupon and Supply Company, LaPorte, Indiana.
International Paper Company, New York, N. Y.
Leer Manufacturing Company, New Lisbon, Wis.
Lilly Company, Memphis, Tenn.
E. L. Lowie & Company, Gastonia, N. C.
National Rejectors, Inc., St. Louis, Mo.
Nickerson & Collins Co., Chicago, Ill.
Ohio Galvanizing & Manufacturing Company, Niles, Ohio.

(Continued on page 47)

Willoughby Honored

O. J. Willoughby, Atlanta, Ga., former editor and publisher of Refrigeration was honored by the ice industry at the annual banquet with presentation of a silver bowl inscribed: Presented to O. J. Willoughby by the National Association of Ice Industries in appreciation of his devoted loyalty, steadfast courage, creative vision, and inspiring counsel as a distinguished editor and ardent champion of the Ice Industry of America, November, 1956.

New refrigerated warehouse of Higley cold storage, Mason City, Iowa, on loading dock side.

New Warehouse Building Provides Added Refrigerated and Freezing Space

A NEW refrigerated warehouse has been constructed and put into operation by Higley Cold Storage, Inc., at 633 15th St. S. E., Mason City, Iowa, offering additional refrigerated space and ample modern blast freezing facilities. Incorporated are the newest and most modern ideas in low temperature warehousing and handling equipment.

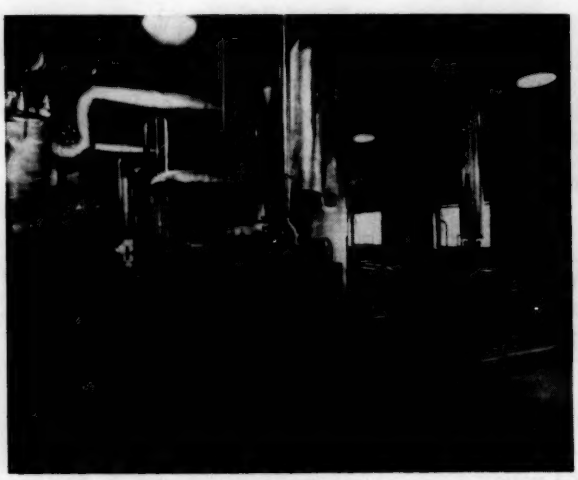
The new warehouse is one story in height and contains 400,000 cubic feet of refrigerated space, one-fifth of which is convertible to cooler storage. It is of concrete and steel construction and is insulated throughout with Fiberglas. Products in and out of storage are handled with electric mechanical materials handling equipment, all palletized.

Refrigeration Equipment

The engine room is equipped with Vilter refrigeration equipment, two-stage and recirculating ammonia in fin coils capable of minus 20 degrees F holding temperature. Blast freeze facilities for approximately 45,000 pounds of product a day at temperatures as low as minus 40 degrees F also are available.

This plant is completely sprinklered, so insurance costs are low. Other protective devices include a completely integrated electrical control for fully automatic operation of engine room equipment. Protective devices shut down any or all equipment that may be in trouble and give a signal as to the cause of the trouble.

Hot gas defrosting equipment, consisting of heat exchangers, pumps and piping, enable defrosting of any



Machinery room views in the new Mason City warehouse of Higley Cold Storage, Inc., showing relative location of the six NH_3 compressors and associated vessels. Above photo, comparison of compressor bases in the foreground indicates the advantage of the new high-speed multi-cylinder unit over the slower vertical machine. The older type requires isolated foundation of equal mass to itself (in this case recessed in the machine room floor) whereas the newer machines can have their steel frame base set on any substantial floor.

Right photo shows, suction accumulator, intercooler and other vessels. Panel at extreme left houses selector switch, temperature indicating potentiometer and recording (dial-type) controller.

Right, another corner of machinery room. Electric controls, starters, safety-switches and indicators are mounted at left. Automatic sprinkler dry-type system center is located in the corner, and adjacent wall carries drain piping, various alarms and refrigerating plant gauges.

pipe coil in the warehouse in a matter of minutes. Temperature indicators provide engine room operator at a glance an accurate reading of temperatures in various sections of the warehouse as well as in the sub soil and outside.

An enclosed loading dock provides for five rail cars and five trucks at one time. Rail service is on a spur of the MC&CL Railroad, with connections to the Milwaukee Road, M&StL, Great Western, Chicago & North Western and Rock Island lines. In transit storage privileges are available.

The new warehouse is operated along with the present plant facilities at 405-411 South Federal Ave. & 824 S. Deleware Ave., in Mason City. The three plants offer a total of almost 600,000 cubic feet of refrigerated storage space, operated with more efficient service than in the past due to the additional new facilities. The main office of the company will remain at the present location, 409 S. Federal Ave., Mason City, Iowa.

Original Higley storages were established in 1880. The 400,000 cu. ft. described here is in addition to 675,000 cu. ft. in other Mason City Houses. Officers of the firm are C. F. Beck, Pres. & Gen'l. Mgr., H. W. Beck, Sec'y. and Francis Beck, Treas. Supt. is B. O. Deeny and Wm. H. Turnbull, an NAPRE member, is Ch. Engr.

One of the storage rooms in New Higbley warehouse with stacked boxes and cartons.

White Rings In Frozen Bread

IN THE project on frozen bakery products, Western Utilization Research Branch, USDA, Albany, Cal., the phenomenon known as "white ring" has been investigated. In frozen bread, it appears as a narrow, more or less complete ring, an eighth to a quarter inch inward from the crust and eventually the central portions of the slices are affected.

The whitened areas of the loaf become significantly drier than adjacent areas, but they appear without loss of total moisture and without shift in distribution of moisture within the loaf. Preliminary evidence indicates that such factors as shortening, milk solids, starch, rate of freezing and defrosting have no influence but that storage temperature does have a casual effect. At 15 and 20 F, the rings appeared within two weeks, but at 0 to 10 F a period of ten weeks was required. Thus it looks as if white rings are evidence of improper holding temperature. — TRRF Bulletin.

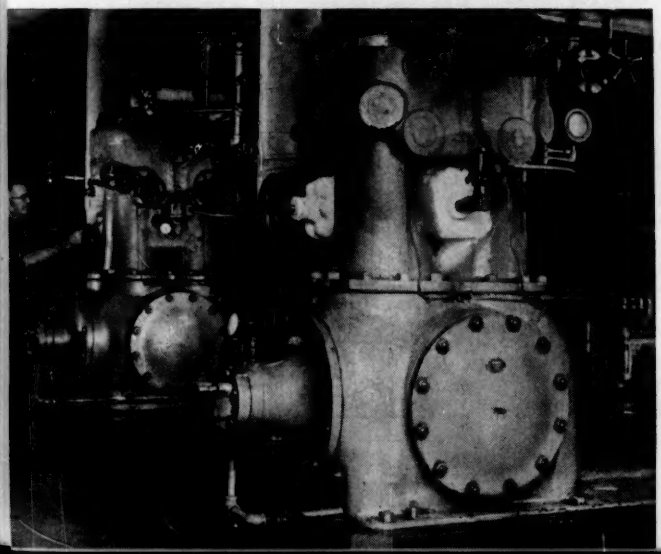
Chicago Refrigerated Warehouse Publicity

IN ONE OF a series of "Chicago First" cartoons, the Chicago American recently recognized the refrigerated warehousing industry. The legend under the cartoon read: "More capital is invested in freezer and cooler storage facilities in Chicago than in any other city in the world. The cold storage capacity of all Chicago plants, aggregating approximately 36,305,000 cubic feet, represents more than one-sixth of available storage space in the entire U. S."

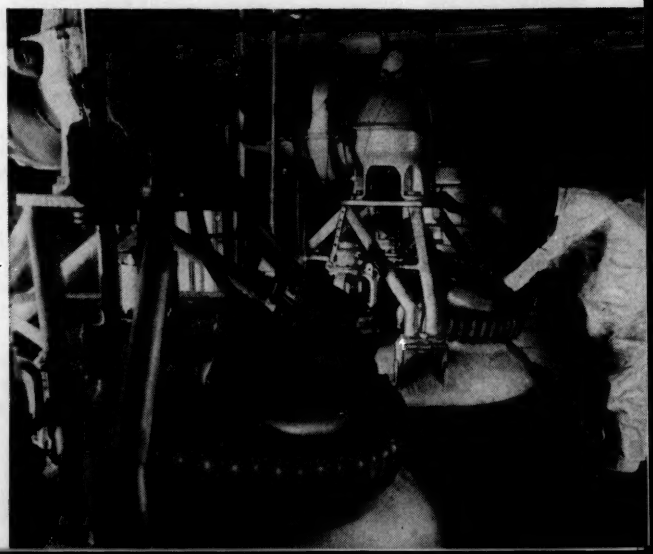
Chicago FIRSTS:
By Earle Harvey
MORE CAPITAL IS INVESTED IN COLD STORAGE FACILITIES HERE THAN ANY OTHER CITY IN THE WORLD!
FROZEN FOOD
BUSINESS IS CALCULATED RISK!
HARVEY

SPIDER WEB in piping reaches far ends of a refrigeration system supplying more than 25 buildings at MERCK & CO. Inc.'s Rahway, N. J. plant.

BACKBONE OF CENTRAL SYSTEM is two 75-ton York compressors. Here, ammonia is piped to remotely located brine tanks and attendant coolers where refrigerant is used in processing fine chemicals.



PRECISE TEMPERATURE CONTROL (to 0°C), supplied by York equipment proves vital for purification of an important vitamin product.



YORK® PRIOR PLANNING SERVICE helps assure maximum return on refrigeration equipment investment

- **Today's refrigeration systems must meet stringent demands for performance accuracy, operating reliability and length of life.**
- **York's *5-point* PRIOR PLANNING SERVICE is designed to give you and your consultants the benefits of top refrigeration engineering experience *right from the outset.***
- **When you specify York, you know that the intricacies of equipment design, selection, co-ordination, installation, operation and up-keep will be met in the manner your investment merits.**

York sales engineers work with you, your consulting engineer and your contractor from the very first planning stage right through start-up . . . and beyond. We call this PRIOR PLANNING SERVICE, and you benefit in these five ways:

1. You get precise technical data. The York engineer will help analyze the refrigeration requirements your system must meet including temperature levels, fluctuating loads. Then, he will make available to you all the facts and technical data you need to make your decision.

2. York helps you select the equipment tailored to your specific system requirements. York supplies *all* types of refrigeration equipment depending upon the needs of the job. As a result, your York engineer studies your problem *objectively*, recommending the equipment that is right for your job.

3. You get the most efficient use of time, materials and equipment. Because of his refrigeration experience, your York engineer can help your engineers and contractor with suggestions in solving design, space problems. Thus he aids in avoiding expensive changes later on, assures the most economical use of equipment and materials in minimum time.

4. York supervises system installation. When desired, installation of York equipment is supervised on location by a York engineer who will test and adjust the system, and train your operators to assure you of the highest productivity at lowest cost.

5. York "insures" against costly downtime. When you specify York, you can also specify York Certified Maintenance which is your assurance of continuous operation at low cost. With Certified Maintenance you get regular inspections, *all* necessary repairs, unlimited emergency service, start-up and shutdown service, and regular written reports for a nominal annual cost.

York refrigeration system installations include the gigantic environmental laboratory for U. S. Navy, Trenton; Sunkist's California Lemon Exchange; Carling Brewery in Natick, Mass.; Lehigh Valley Cooperative Farmers modern milk plant at Allentown, Pa.; Westinghouse, Baltimore.

You may rely with complete confidence upon the good judgment, recommendations and service of your YORK engineer. Call him *early* in your planning or write — YORK CORPORATION, subsidiary of Borg-Warner Corporation, York, Pennsylvania.

York refrigeration air conditioning YORK B-W

the quality name in refrigeration

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

YORK CORPORATION

SUBSIDIARY OF BORG-WARNER CORPORATION

Michigan Storage Adds Large Addition

A NEW addition that nearly doubles the size of the large plant of the Southern Michigan Cold Storage Company on Pipestone Road between Benton Harbor and Sodus was put in operation the middle of September. The first section of the original plant was put in operation and formally opened in July 1955, an illustrated description of which was published in the September 1955 INDUSTRIAL REFRIGERATION.

The building, including the new addition is almost the size of two regulation football fields laid end to end, with a frontage of 587 feet and width of 160 feet. Cost of the entire building and equipment was approximately $1,500,000. Extending from the building proper a 30-foot truck dock runs the full length of the front and a 16-foot rail dock extends nearly the full length of the rear.

Southern Michigan Cold Storage Plant, Benton Harbor, Michigan

The refrigeration system has recently been increased to take care of the new cold storage rooms and freezing facilities. The latest addition consisted of installing 2 - 13¼ x 9 VSA ammonia booster compressors operating at 400 rpm at a suction temperature of − 40°F. and a discharge pressure of 25 lbs. The booster compressors discharge into the existing 36 inch diameter by 8 foot long liquid and gas cooler. The second stage of compression was augmented by the installation of two Frick 2 - cylinder 9 x 9 ammonia compressors operating at 327 rpm with a 25 lb. suction pressure and a 150 lb. discharge pressure.

The entire first stage of compression is now handled by five Frick model PAB 9 cylinder ammonia booster compressors and three 13¼ x 9 ammonia booster compressors. The entire second stage load is now handled by four 9 cylinder ammonia compressors and three 9 x 9 vertical enclosed machines.

The freezing capacity of the plant now has a capacity for the freezing of 650,000 lbs. per day. The freezing is done in 12 blast type freezers 24,000 cfm of air being circulated in each tunnel. 1120 connected horse power is required for operating the plant at maximum capacity.

In addition to the new equipment added for the increased freezing and zero storage facility, additional Frick air handling units installed in the basement coolers for handling the 32 to 40 degree coolers. An additional well has been drilled, making available approximately 600 gpm of 52 degree water for condensing purposes.

The office area of the cold storage plant is heated by approximately 10 gpm of water leaving the condenser at a temperature of approximately 65 degrees. This water is then piped to a 4 ft. x 12 inch Frick water heater-oil trap located in the discharge line of the second stage compressors. The water is heated to approximately 80 degree in the heat exchanger, and is then piped to a 5 hp. heat pump which is used for heating the office and locker room area. The heat pump being of the reversable type is also used for air-conditioning the areas during the summer months.

The compressors are all equipped with oil pressure failure switches and high and low pressure cut-outs. The compressors are operated manually, and are sized so that as the freezing load increases it is only necessary to start sufficient compressor capacity to handle the additional freezer load.

The mass of the product being stored in the freezer storage rooms is so great that very close temperature control can be maintained by manually operation of the compressors. The temperature in the 32 to 40 degree coolers is maintained by the use of thermostats and solenoid control valves holding temperatures to within a plus or minus 1 degree F.

Manager M. S. Fuller says prospects are for a high rate of storage occupancy for the complete plant this winter and spring. Stored products cover a wide range of frozen foods, including fruits and vegetables, meat, poultry and dairy products.

New Brunswick Backs New Food Plant Bonds

PUBLIC financing in connection with two food processing plants now under construction at East Florenceville, N.B. Nova Scotia, has been completed by W. C. Pitfield & Co. The bonds, already sold, are unconditionally guaranteed by the Province of New Brunswick. They include $280,000 five percent first mortgage sinking fund bonds of McCain Foods Ltd. and $140,000 five percent first mortgage sinking fund bonds of Carleton Cold Storage Ltd. Both issues mature in 1976 and were offered at 97 to yield 5.24 percent.

The two companies were incorporated in June, 1956. Both plants, it is stated, will be the largest food processing plants of their type in the province. East Florenceville is an important vegetable and fruit growing area. McCain Foods will own and operate the food processing plant and the Carleton Cold Storage, the cold storage and quick freezing plant. The McCain plant will cost an estimated $500,000 and the cold storage plant, $260,000. The Canadian Government will make an $87,000 grant, equal to one-third of the capital cost, for the cold storage plant.

The bonds are noncallable until 1956, except for sinking fund purposes. The sinking funds start in 1960, and will retire $187,000 and $96,000, respectively, of the McCain and Carleton issues.

In addition to guaranteeing the Bonds unconditionally, the province will also undertake to furnish any deficiency in sinking fund payments.

In the case of Carleton, company owners have agreed to subscribe to $40,000 in common stock; in the case of McCain, $100,000 in preferred and common.

Practical Refrigerating Engineer

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS

One Part Which Management Should Play in the –

Cream Cooler Explosion In Dairy Killed One Man, Injured a Second.
—Photo Courtesy, "The Locomotive".[1]

Prevention of REFRIGERATION PLANT FAILURES

THE EDUCATIONAL COMMITTEE
NAPRE

MAINTENANCE and operating practices in plants employing industrial or utility refrigeration in many instances are still far from adequate. Each month, in most all trade publications and outside house organs of insurance firms, safety associations and manufacturers of refrigeration equipment and piping, there is at least one story of a plant failure. The percentage of such derangements remains in the 50 - 50 category; that is, about 50 percent attributable to human error, the other 50 percent to several other causes including equipment or control failure.

An old saying that the situation will probably get worse before it gets better, probably applies in this case. Not that this is the official attitude of NAPRE (the association does not intentionally go in for negative thinking), but it does reflect the fact that present approaches by business, associations, and individuals to a solution, involve time. Time for practical engineering personnel to acquire education; the knowledge, training and experience so necessary to their competency and efficiency.

There are many facets to this problem. The more angles, the more complicated it becomes. Competent manpower is the most important efficiency asset to the refrigerating enterprise. Yet, it is the greatest single item of overhead with regard to operating expense of any business that requires refrigeration as a utility.

EXECUTIVE OFFICE NAPRE
433 N. Waller Ave.,
Chicago 44, Ill.
OFFICERS
President: Bert C. McKenna
Chicago 12, Ill.
Secretary, J. R. Kelahan, Chicago 44.

Operating engineers of all refrigerating plants are invited to affiliate with the National Association of Practical Refrigerating Engineers, Inc., an educational association, "not-for-profit".

[1] "The Locomotive", a quarterly magazine published by The Hartford Steam Boiler Inspection and Insurance Co. All photos, with exception of the three shown in Fig. 1, are published through the courtesy of "The Locomotive."

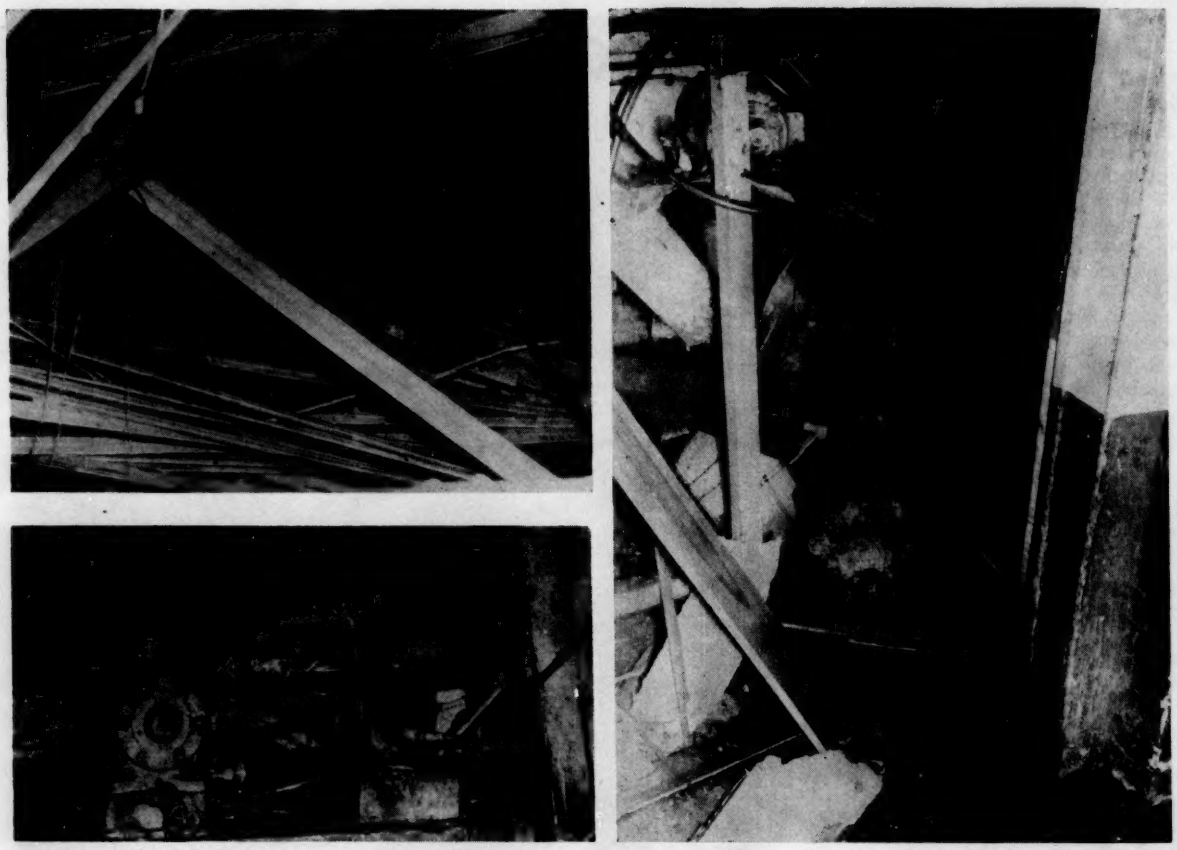


Fig. 1. Three views of refrigeration plant explosion which killed two men and injured third. Top left shows position of compressor motor. Piping at right had been connected with the condenser. Below, a close-up of the compressor, showing head and usual piping attachments completely knocked off. Piston is visible in the remainder of the cylinder. At right, a view from the machinery room entrance.

Automation To Save Overhead

Manufacturers of refrigeration equipment, alert to this problem of their customers, have turned their engineering talent and energies toward providing more and more of the so-called automatic systems. Such equipment, either in new or converted systems, allow substantial reduction in operating personnel. However, it has brought about a new problem. The new headache involves locating an engineer technician to service the new complicated apparatus and its controls. The practical plant engineer of yesterday has become the plant technician today.[2]

[2]"Practical Engineer trains For Associate Level"; Karl O. Werwath, President, Milwaukee School of Engineering; Industrial Refrigeration, Febr. 1956, page 31.
[3]"Shortage of Scientific & Engineering Manpower"; Hearings before the Subcommittee on Research & Development, 84th Congress, May 1956.
[4]"Profile of a Power Engineer"; National Engineer (the official organ of the National Association of Power Engineers) Dec. '56, page 3.

Creates Technician Shortage

Further, the acquiring of competent technical engineers to supervise operating and maintenance of the automatic plant, is complicated by the rapid expansion within the refrigeration and air conditioning field itself. Training of personnel for even the simplest supervision and service has not kept pace with the production and installations of such systems. Moreover, better paying sales and general management positions with manufacturers, jobbers, and contractors of refrigerating lines has attracted the practical engineer from the engine room and the erection field.[3]

Forces New Methods of Procurement and Training

Like all engineering fields today, competition for qualified engineers is very keen. Proselyting is the tactic of the day. Professional engineering groups have pointed out where refrigeration and air conditioning are losing out to other fields like aeronautics, electronics, chemicals, petroleum, and nuclear engineering. Concern expressed by leaders in all branches of the refrigeration field, has lead NAPRE officers to conclude that businesses employing large refrigeration tonnages which involve practical engineers, must "grow their own". The Association even goes so far as to suggest a little haste in the "growing", as recent surveys indicate the average age of the practical man is 50 to 55 years.[4]

Refrigeration is a specialty regardless where used, in air conditioning, industrial ice making, refrigerated storage, brewing, chemical manufacturing, meat packing, dairying, aircraft manufacturing, and the literally hundreds of other businesses which employ it to a lesser degree. Personnel, whether operating large machinery or responsible for servicing or maintaining small unattended plants, must know their systems, its components, what is expected of the

Take a tip from those who know refrigeration best!

A. A. Silverman, President
The Vilter Manufacturing Company

"Trouble-free operation of your refrigeration system requires highest purity ammonia.

"Our customers can't afford a plant shutdown or even a slowdown. That's why we charge all new installations with ammonia of the highest purity.

"We advise our customers to continue this care. Old and new refrigeration systems must be kept free of oil, non-condensable gases, water, air—foreign matter usually found in inferior grades of ammonia.

"Always insist on the highest purity ammonia. You'll find it always pays."

Do as so many leading manufacturers of refrigeration equipment do. Use only Armour 99.98% pure ammonia. It's extremely dry and free from all oil and non-condensible gases. Best of all—Armour has 155 cylinder stockpoints from coast-to-coast and 7 strategically located bulk stations—*more than any other manufacturer!* That's why those who know refrigeration best call on Armour for dependable, fast service.

ARMOUR *Ammonia Division*

SEND FOR FREE AMMONIA DETECTORS!

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ARMOUR AND COMPANY
1355 West 31st Street, Chicago 9, Illinois

- ☐ Send me *FREE* Sulphur Tapers and sensitive Test Papers for detecting ammonia leaks.
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Fig. 2. Remains of the condenser and internal tubing, show the violence of this explosion.

system, how to make this plant perform to expectations. Such knowledge cannot be limited to memorized or habitual routine. The why and wherefore of seemingly unimportant functions and performance of the smallest mechanical or electrical items, controls and safety devices have taken on an importance as never before. Safety practices and procedures need emphasizing to even greater extents.

Association Expands Program

At the 47th annual NAPRE Convention, the Association Board of Directors and Educational Committee took cognizance of this situation. As a result, the Association intends to expand within financial and physical capabilities of the organization, its educational program initiated under the leadership of the late Professor H. G. Venemann at the 44th Convention held at Purdue University in 1953.

At the risk of some repetition, a few case histories will be presented in support of the arguments offered here. It is hoped that the citing of these incidents will be accepted by management as evidence of NAPRE's awareness of an industry need, its sincerity of effort, and intentions to help the refrigerating and air conditioning industry overcome such difficulties at the practical level.

Plant Explosion Kills Two

Early in 1956 an accident occurred on a week-end in a refrigerating plant which killed two men and placed a third on the critical list for a number of months. This severe explosion which completely demolished the machinery and part of the building (see Fig. 1) apparently resulted from an improperly evacuated system. The system had been down a few hours before for repairs.

Investigating officials found that the condenser had ruptured, part of the compressor disintegrated and

Fig. 3. Circulating pump and freeze-out controls both failed. No one noticed the pump failure. A maintenance man found the leak, too late!

damage to certain valves, gauges and accessories. The compressor had actually been the object of repair. On completion of repairs and its re-assembly following the customary procedure of cleaning all parts, the unit was apparently started up without purging atmospheric gasses and those accumulating from the oil and cleaning solvents.

The committee noted that the discharge valve of the compressor was open and the king valve at the receiver closed. The relief valve was found about eight feet from the machine in the open position. Since all valves were open on the discharge or high-side up to the king valve, plus the fact that the relief valve was found inoperative in the open position, it appears excessive heat was built up in the discharge side of the system. The fact that the relief valve was missing its fiber seat supports the theory of excessive heat. The open relief valve permitted recycling the gas, adding to its heat.

Since one experienced party who had been servicing the equipment was deceased, the investigators had to draw their conclusions from the condition of the system at the time of the investigation. Their consensus was that excessive heat had caused combustion of ammonia vapor which contained a quantity of concentrated atmospheric gases and oil vapor, or transmission of this heat to the condenser caused ammonia liquid within that vessel to vaporize at such a rapid rate that it could not escape. Pressure within the vessel built up to the extent that the rupture pictured in Fig. 2 took place.

It was never determined why the parties killed were standing over the equipment at the time of the ex-

Fig. 4. Evidence that liquid refrigerant is practically non-compressible. It was less expensive to replace the entire compressor in this case, than to attempt repairs.

Figs. 5-6. Left, view of wall which collapsed, causing rupture of utility services including refrigerant lines. Right, contamination by dirt, debris and refrigerant caused loss of freshly chilled meat.

plosion. The fact that one of the three parties was experienced leads all who sit in post mortem judgment of the case, to the conclusion that haste, familiarity with the system, or some distraction caused the engineer to overlook normal safety procedures in which he was indoctrinated, and possibly even to overlook some of the dangerous pressures and temperatures which were building up and which should have been evident on his instruments.

Increasing Number of Air Conditioning Failures

In July 1956 "The Locomotive"[1] carried the following account: "As air conditioning installations are really only modifications of refrigerating units, most of their hazards are practically identical to those common to refrigerating apparatus, and they therefore require the same care and maintenance[5]. An interesting accident, illustrating a hazard more prevalent with air conditioning equipment, recently occurred. A water chiller of a 60-hp "Freon" system, was damaged to the extent that it had to be replaced (see Fig. 3).

"The maintenance man noticed that water was leaking from the chiller, and after the metal jacket and cork insulation were removed, found that the vessel had cracked open in three areas. An investigation disclosed that for some reason the water-circulating pump had failed to circulate the water to a heat exchanger where its temperature would normally have been raised, and that the water remained in the chiller where its temperature had continued to drop. A freeze-out control having a thermal bulb immersed in the water should have acted to shut down the compressor to stop the cooling action. However, that control was defective and failed to function."

In another instance, also reported by "The Locomotive", the damage to the "Freon" compressor was so extensive that it was considered more feasible to replace the compressor than to attempt repairs (see Fig. 4).

Vibration Hazard

"Installed in 1954, the compressor had been operating smoothly until sudden vibration caused several light-gauge copper pipes to break. The pipes were quickly repaired, but when an attempt was made to place the compressor in service the vibration was so pronounced that the compressor was immediately shut down and dismantled.

"In addition to the damage shown, the cylinder block and all of the cylinder liners were found to be broken. It is believed that refrigerant in liquid form had carried over into the cylinders. Unlike vapors, the liquid could not be compressed to a smaller volume, and therefore obstructed the piston strokes."

[5]Readers who wish to review the subject can reread "Human Element Most Persistent Underlying Factor in Ammonia Compressor Failures," by Earl L. Kemmler, reprinted in the April 1956 INDUSTRIAL REFRIGERATION, page 13. Although the article is primarily concerned with ammonia compressors, much valuable information applicable to air conditioning equipment is also covered.

Liquid Slugging Never An "Accepted" Practice

Accidents are often foreseen by inspectors, when engineers are "too close to the forest to see the trees". "When an Inspector of the Hartford Steam Boiler Inspection and Insurance Co., entered a large plant to inspect a refrigerating system for which insurance had been requested, he noticed that one compressor was operating improperly. Apparently slugs of liquid refrigerant were being brought back to the system.

"*He was told that slugging was a common occurrence in the plant.* The Inspector informed the management that unless certain steps, such as installing an adequate trap in the suction line, were taken to prevent the slugging, he believed that a serious accident would eventually occur. One week later, before changes were made, it was reported that slugging in that compressor had caused extensive damage, including bent connecting rods, broken pistons, and cylinder heads."

Pump-Down Blows Receiver

Recently in the Southwest, another explosion attracted attention in the news wire services. A letter inquiry by an Honorary NAPRE member to a contractor friend, brought this reply: "I talked to one of the refrigeration men who was doing the job at the time. He told me that it was the receiver which blew up; the end blew off breaking clean at the weld — giving the appearance that it was not a good weld. The receiver was made out of a 12-in. pipe, about 11 feet long with flat ends. It had Refrigerant-22 in the system.

(Continued on page 48)

From the President's Desk

Active Participation A Good Resolution — Brings Individual, Association Benefits

JANUARY is the time of the year for NAPRE members to think of a New Year's resolution. How about one that will add to your education, and benefit you in service to your employer? Chapter members can make that resolution a "must" to attend at least one NAPRE meeting a month. It's habit forming. Try it!

To members-at-large that have no chapter to attend, occasional get-togethers with others in your vicinity is suggested. Their names and addresses can be obtained easily by writing the national office. Its surprising how even a small group of say four or five men can make a good meeting. Out of such gatherings may develop a new chapter.

Pushes Industry Relations

An occasional meeting with executive members of your firm can be of interest and much help to both you and your company. A second New Year's resolution could be "The more my boss knows about my plant personnel educational problems, the easier they become". There are many men from top management taking an active interest in NAPRE. Why not your boss? Have you asked him?

Show him the four-year program adopted by NAPRE, which appeared on this page in November. (Reprints are available from national headquarters). Then show him the list of committees working hard at these objectives. (They are listed on this page).

NAPRE objectives are not selfish. Benefits accrue to the employer as well as the individual. Company executives will recognize these facts if you make it a point of calling their attention to our Association achievements and ambitions. In time your company will probably participate to the greater extent of applying for an Industrial Membership.

Award For Best Report

"Report of the Month" award for January to Fred Herr, Los Angeles Chapter. This scribe in the California Chapter No. 2, never misses sending in a report. Even during the summer months, when the chapter is actually recessed he continues to send a monthly report advising of the various social and administrative activities of this No. 2 Chapter in the United States.

Among the items budgeted in the national program of 1957, was an appropriation for the U.S. Savings Bond Award to be given to the chapter scribe who turns in the best report for the year. Your national president, the national secretary and the editor of our official organ are to be the judges. Qualifications and some general suggestions pertaining to the report contest will be circulated to the chapters by the national secretary at an early date.

Burl C McKenna

NATIONAL COMMITTEE CHAIRMEN

Appointed For 1957 Term Educational Committee

Leroy Etzel, Educational Director

This past president has overall supervision of the educational program. With the assistance of another national director and the technical editor of *Industrial Refrigeration* he is responsible for operating articles sponsored by NAPRE each month.

Eugene Rytlewski, Assistant Educational Director

In addition to assisting the Educational Director as noted, this national director will coordinate the activities of the national office and the educational committee in the preparation of the annual educational program for our national convention to be held in Chicago, November 18 to 22, 1957.

Dean Harold Hayes, Chairman

The Chairman has direct responsibility for the coordination of the educational program. His collateral assignment is the Question Box in *Industrial Refrigeration.*

Guy R. King, Vice-chairman

Principal responsibility of the Vice-chairman is the preparation of additional chapters for the Instruction Manual. Included in that project is the listing of audio-visual aids available from various sources as supplementary material to each chapter of *Basic Refrigeration.* This first lieutenant in the educational division is also responsible for the selection of a quarterly educational paper which will be directly circulated to the membership.

Alvis J. Clay, Assistant Chairman.

The special assignment for this aid to the educational committee is that of research into a certificate program for NAPRE members. The committee has gathered some data and made certain recommendations to the board of directors. The project of the Assistant Chairman would be to present a plan to the next convention for the examining and certification of qualified NAPRE members in several categories pertaining to refrigeration and air conditioning.

Membership Committee

George H. Paulick, Chairman.
Hubert Branham, Director-Advisor.

The Chairman contacted all chapters on November 23, stating the theme of the membership program for the year as "competition between industries". He suggests local chapters and regions should compete for prizes which they themselves put up to encourage membership activity. At the local level members of the ice industry, for example, would be competing with the cold storage, meat packing and central station air conditioning groups to see who could get the most members in their own field.

Publications Committee

E. B. Utescher, Chairman.

This past president who is Chairman has overall supervision of the advertising, editorial and circulation of the 1957 Operating Data Book, as well as responsibility for a Chapter monthly news letter and circulars to members-at-large.

J. M. Mariakis, Vice-Chairman.

This national director has been assigned the coordination of chapter effort in obtaining advertising for and promoting circulation of the 1957 Operating Data Book at the chapter level.

Industry Relations Committee

L. H. Benedict, Chairman.
John N. Muller, Director-Advisor.

Principal objective of this committee is to assist the national president in the Industrial Membership drive which will take place April 1 to October 1, 1957. At the chapter level they will encourage an Industrial Membership Night. For a secondary objective, its local chapter publicity. They will advise the chapter on participation in local apprentice programs and encourage the chapters to sponsor a safety night.

Venemann Fund Committee

Charles M. Heemstra, Chairman.
R. A. O'Neill, Director-Advisor

Objective of this committee is to encourage more chapter and members-at-large contributions to this fund. Thus far the Association membership has been the principal contributor. In the face of the contributions coming in from the new Industrial Members, more effort will be required to maintain the reputation of NAPRE being the principal supporter of its own activities.

Convention, 1957

Nicholas M. Downes, Chairman

(Other appointments of chairmen for By-Laws, Finance and other special committees will be made next month.)

NAPRE

Question Box

The National Educational Committee, NAPRE, answers monthly in this column, operating problems forwarded by members. The Committee appreciates answers from the field. Address questions and answers to Prof. Harold P. Hayes, Dean of Engineering, State Polytechnic College, San Luis Obispo, Calif.

Seeks Method For Computing Booster Compressor Capacity

QUESTION NO. 1144: How do you go about finding the capacity of a booster compressor? Suppose I had a 5½ x 6 in., 4-cylinder compressor running at 450 rpm and suction at 0 pounds. What would my compressor capacity be?—E. T., Yakima, Wash.

ANSWER: It is assumed that the subject machine is an ammonia compressor. Two-stage compression is used to avoid the following difficulties:

(1) If a single stage compressor is working over a wide pressure range between evaporating and condensing pressures, the discharge vapor from the compressor is very hot.

(2) Volumetric efficiency of a single stage compressor is very low if it is working with a high compression ratio.

For a given compressor, volumetric efficiency is largely a function of the compression ratio with which it is working. Typical volumetric efficiencies are as follows:

Compression Ratio	Volumetric Efficiency
3	80
4	76
5	73
6	70
7	67
8	64
9	62
10	60
11	58
12	56
13	54
14	52

In order to keep the volumetric efficiency at a maximum for both booster and high stage compressor, the compression ratio of both compressors should be approximately the same. Thus, if it is assumed that the subject system is operating at minus 28 F evaporating temperature (0 psig) and 95 F condensing temperature (181.1 psig), the corresponding absolute pressures will be 14.70 psia and 195.8 psia.

When operating with single stage equipment, the compression ratio would be:

$$195.8 \div 14.70 = 13.3$$

The volumetric efficienty would probably be about 53 percent.

Using two-stage compression with both compressors operating at the same compression ratio, their compression ratios would be:

$$\sqrt{13.3} = 3.6$$

and their volumetric efficiencies would probably be about 78 percent. The interstage pressure would be:

$$14.7 \times 3.6 = 53 \text{ psia}$$

which corresponds to a saturated temperature of about 24 F.

Assuming that the liquid ammonia is fed to the low temperature evaporator at 24 F, the refrigerating effect per pound of ammonia will be the differences of enthalpies between saturated vapor at minus 28 F and saturated liquid at 24 F.

$$H = 602.1 - 69.1$$
$$= 533.1 \text{ Btu/lb.}$$

The volume of vapor pumped by the compressor is:

$$V = \frac{N \pi D^2 L E \text{ (rpm)}}{4 \times 1728}$$

where V = the volume of vapor pumped (cu. ft.)

N = the number of cylinders

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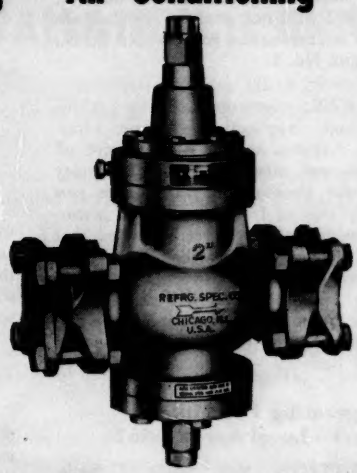

AVAILABLE CONNECTIONS ODS	FPT	Welding	Port Size	Tons @ 40° F. F-12	F-22	Ammonia
⅞, 1⅛, 1⅜	¾, ½	¾, ½	¾	2.0	2.7	7.0
1⅛, 1⅜, 1⅝	1	1	1	3.8	4.9	11.0
1⅜, 1⅝, 2⅛	1¼	1¼	1¼	6.0	7.8	20.0
1⅝, 2⅛, 2⅝	1½, 2	1½, 2	1⅝	10.7	14.0	36.0
2⅛, 2⅝	2	2	2	17.4	24.0	50.0
2⅝, 3⅛	2½	2½	2¼	23.0	29.0	60.0
3⅛, 3⅝	3, 2½	3	3	44.0	60.0	140.
4⅛	4	4	4	85.0	115	250.

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FREON-22
AMMONIA

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D = the base of the compressor (inches)
L = the stroke of the compressor (inches)
E = the volumetric efficiency
rpm = the rotative speed of the compressor

$$V = 4 \times 3.14 \times (5.5)^2 \times 6 \times 0.78 \times 450/4 \times 1728$$
$$= 116.0 \text{ cu. ft/min.}$$

Pounds of refrigerant pumped would be the above figure divided by the specific volume of the vapor at minus 28 F.

$$116.0 \div 18.0 \times 6.44 \text{ lb.}$$

The capacity of the machine would be

$$\frac{6.44 \times 533.1}{200} = 17.2 \text{ tons}$$

— N. S., San Luis Obispo

Why Should New Apples Be Separated From Mature?

QUESTION NO. 1145: I know that apples intended for long storage should be stored separately from more mature apples. What I want to know is why this difference is necessary? It seems to me that storage temperatures should be about the same and so long as I take the fruit out at the right time, what difference does it make if I mix non-mature and mature apples in the same room?—R. T. B., Michigan No. 1.

ANSWER: According to the ASRE Data Book, Applications Volume, Chapter 19, "Apples held in storage give off ethylene and other volatiles which may hasten the ripening process. This is particularly true of fruit of advanced maturity. Consequently it is recommended that apples for long holding should be stored separately from earlier ripening or more mature fruit." The TRRF Commodity Storage Manual contains similar recommendations, as do a number of State and Federal Bulletins — H. P. Hayes

Refrigerating Principles Apply To Local Anesthesia?

QUESTION NO. 1146: I have heard of the application of refrigeration as an anesthetic in some cases of surgery. Has this really been done? If so, what fundamental principle is involved?—C. A. H., Chicago.

ANSWER: Refrigeration has been successfully used as an anesthetic. It is particularly valuable in cases where ordinary anesthetic cannot be used because of a heart or brain condition in the patient.

In the amputation of an arm or leg, the limb is peaked in ice and chilled to about 10 F, above the freezing point. The operation can then proceed and the patient suffers no shock, nausea, or other after-effects. Apparently the nerves become so numbed by the ice pack that they cannot transmit the usual pain impulses to the brain.

Just last month, on page 8, INDUSTRIAL REFRIGERATION reported how ice was used to lower a boy's temperature for 10 minutes, from 98.6 to 88 F, for performance of a critical heart operation. Although this was not purely an anesthetic application, it shows how extensively refrigeration can be applied in surgery. Lowered temperatures provide a relatively bloodless field in which the surgeon can operate. — H. P. Hayes

The "Why" Of Floor Heaving

QUESTION NO. 1147: I know that water under a floor, when it freezes, can cause heaving and damage to the floor. What I don't understand is where the force comes from to cause the heaving. How can the simple freezing of water produce enough force to crack concrete floors?—E. F., Venemann Chapter.

ANSWER: When freezing, water expands one-eleventh of its original volume. If sufficient force were applied to keep the water at its original volume, it would not freeze. Or, if sufficient pressure were applied to ice to compress the ice to its original volume, it would return to its liquid state.

However, the compressibility of ice is very small:

$$1.2 \times 10^{-7} \text{ in}$$

Compressibility is defined by the formula:

$$B = \Delta V/V_o \, (1/\Delta P)$$

where, B = the compressibility
= the change of volume (cu. ft.)
V_o = the original volume (cu. ft.)
= the change of pressure (atmospheres).

Pressure exerted by one cubic foot of water when changing to ice would be the same as the pressure required to compress the ice to its original volume in the liquid state. From formula (a), this pressure would be:

$$\Delta P = \Delta V/V_o \, (1/B)$$
$$= 1/11 \, (1/1.2 \times 10^{-7})$$
$$= 7.6 \times 10^6 \text{ atmospheres.}$$

With this pressure, it is little wonder that the freezing of ice can rupture pipes, automobile radiators and even the foundations of buildings. — N. S., San Luis Obispo

Is Radiation Important To Heat Gain Calculations?

QUESTION NO. 1148: In calculating heat gains, I can understand convection and conduction but radiation gives me trouble. Aren't there any good rules of thumb for calculating radiation heat gain? This business of time lag, emissivities, and other factors seems more complicated than it should be.—G. A. P., Calif. No. 2.

ANSWER: I wish there were some easier ways of calculating radiant heat transfer. Some special cases have been simplified to charts or tables, but generally problems in radiation transfer are difficult to solve.

If you will consider what takes place in the apparently simple problem of solar radiation striking the wall of a building, you can see why the problem gets complicated. In the first place, the amount of heat radiated varies as the fourth power of the absolute temperature of the radiating body.

This fourth power complicates any arithmetic or algebra used. When the energy strikes the wall, some of it will be absorbed and some will be reflected. The relative amounts of absorption and reflection depend upon the type of surface, its temperature, and its surroundings. In addition, some of the energy which is absorbed in re-radiated to cooler objects near the surface.

Moreover, radiant energy travels in straight lines, so radiant exchange takes place only between areas which "see" each other. Consequently, if the wall surface is at an angle other than perpendicular to the ground (as in many modern business buildings) there are problems in determining exactly how much of the area is involved in the radiant transfer.

These are only some of the factors which complicate radiation transfer problems. They at least illustrate why there are no easy solutions available to many of the problems. — H. P. Hayes

New Questions

Magnesium Chloride Suitable As A Refrigerating Brine?

QUESTION NO. 1149: Why are brines always made with calcium chloride or sodium chloride? Why wouldn't any salt work just as well? For example, could magnesium chloride brine be used?—H.C.D., Denver.

Reduce Unit Capacity By Change of Refrigerant?

QUESTION NO. 1150: We are operating a 10 ton Refrigerant-22 package unit. It is oversize for the job. If we restrict the air being delivered we have coil freeze up. I would like to switch to Refrigerant-12 to reduce the capacity of the unit. What would have to be taken into consideration in making the change? Is it practical?—K.M.D., Chicago.

Wants proof of Infestation Protection By Cold Storage

QUESTION NO. 1151: INDUSTRIAL REFRIGERATION, November '56, states on page 35 that refrigeration is the safest and surest way to protect nuts and dried fruits from insects. Can you prove this? What temperatures are necessary to accomplish this?—California Rancher.

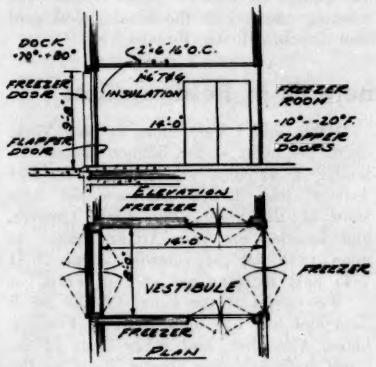
Heat Exchanger Cleaning Job

QUESTION NO. 1152: In our plant we have several old time open shell type water cooled heat exchangers for condensing our ammonia. Although we have a regular maintenance

schedule that calls for brushing out these tubes, over a period of time they have gradually scaled up somewhat. Can you recommend some practical means of cleaning these tubes with a conventional tube cleaner with a mechanical cutterhead? We want to keep the condensers on the line while we perform this cleaning operation.—W.O.R., Chicago.

Cold Room Vestibule Icing Partly Defeats Design Use

QUESTION NO. 1153: Members of NAPRE and other IR readers may be interested in a problem we had to solve recently. In one of our plants, the vestibules were "air-conditioned" but they were not insulated. We had constant trouble with ice on the vestibule floors causing our fork-lifts to slip and slide. We also had ice on the auto-close doors into the freezer room causing them to stand partly open.



We found a good solution and are wondering if other members or readers would have solved this problem in the same way. Why don't you publish this in the Question Box and see what answers you get? I will be glad to send my answer if you want it.—C.A.C., Memphis.

What Difficulty Can Occur By Oversizing Pipe Systems?

QUESTION NO. 1154: From time to time you have published questions on pipe sizes and how to check for undersized piping. I have two questions. First, is oversized piping harmful in any way? Second, can you show a specific example of a typical system and how pipes in that system should be sized?—J.A.K., Chicago.

New Warehouse

Harry Price operator of the Gleed Cold Storage & Packing Co., Seattle, Wash. is said to have taken an option on the former Associated Growers building in downtown Seattle for a new refrigerated warehouse.

Cold Cash

A waitress in San Luis Obispo, Calif., told her businessmen customers she preferred "cold cash" for Christmas so they gave her $25 in coins frozen into a 25-pound cake of ice.

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News Notes and Chapter Activities

Steel City Chapter Elects New Officers

PITTSBURGH — Principal items of business which came before the Pittsburgh Chapter, NAPRE, at the October 25 meeting were the election of officers and a resolution to change the meeting night. Members voted to change the chapter meeting night to the third Wednesday of the month, which seemed to have less conflict with other engineering activities in the city of Pittsburgh. At the same meeting the members voted to dispense with the November and December meetings and hold a Christmas party on December 12. The proximity of the new meeting date for December to the Christmas Holidays prompted this action.

Officers elected for the 1957 term were: President, Clyde Dalton, Pittsburgh Brewing Company; Vice-president, James Crenner, Fort Pitt Hotel; Secretary-treasurer, Otto Knoch, Horne Department Store; and, Sergeant-at-Arms, Edward G. Tessmer, Pittsburgh Brewing Co. — OTTO P. KNOCH.

Four Operating Problems Highlight Packers Meeting

GREEN BAY — One of the finest programs of the last several months was held at Green Bay Chapter on November 4. Four operating problems were discussed by three members and an insurance company's representative. Participating in the discussion was H. C. Liebmann, Jr., a newer member, Lambert Bodart and Lester Winkler, both chapter past presidents, and a Mr. Mummey of the Travelers Insurance Company.

Liebmann discussed electricity and electrical problems in the operation of a refrigeration plant. Bodart discussed the application and maintenance of liquid pumps. Winkler followed with plant maintenance, and impurities and moisture in refrigerating systems. Mummey discussed safety maintenance and operation of plants of all kinds from the view point of an insurance engineer.

What started out to be a 40 minute session ended up after 90 minutes of very lively discussion and with each panel member having answered several questions. It was evident the group thought this a very worthwhile program and it was suggested that another be planned like it in the near future. Chapter president Amos Vierbicher presided over the business meeting and the discussion period. —J. B. SCHOUTEN.

Venemann Chapter NAPRE Works on New By-Laws

INDIANAPOLIS — A rough draft of the By-laws for the Venemann Memorial Chapter, NAPRE, was read to the members present at the chapter meeting held Wednesday evening, November 14. A number of suggested changes were made and the By-laws referred back to the committee for consideration of such proposals. A series of such readings are planned for the next few meetings before the final revision of the By-laws are adopted and referred to national headquarters for approval.

Attendance at this meeting was almost 50 percent of the membership, a high for the Indianapolis area. The chapter meets at the Veteran's Administration Hospital. The one hour refrigeration class was held prior to the business meeting. Following the work on the By-laws, President Tony Wochna reported on activities at the National meeting held in October at Detroit. —JIM LUDEWIC.

Colton Studies Compressors Elects New Officers

SAN BERNARDINO — California Chapter No. 5, NAPRE, Colton, held its regular meeting November 14, at the Santa Fe Ice Plant lunchroom. The refrigeration class subject was Compressors given by Instructor Frank Scherer. The members participated in several questions and answers. The meeting was then given over to C. H. Purkiss for a report and color slide pictures on this trip to Detroit and Convention activities, and more beautiful pictures of his return trip by way of the Royal Gorge, Denver, and Salt Lake.

The new officers nominated and elected by the members at this meeting are: President, J. E. Machut, Pacific Fruit Express; 1st Vice-president, J. E. Finfrock, Santa Fe Railway; 2nd Vice-president, Alfred L. Long, Ted Cox Welding Supply; Secretary-treasurer, Harry O. Bonter, Pacific Fruit Express; Sergeant-at-Arms, Roy G. Ashcom, Pacific Fruit Express; Educational Instructor, F. J. Scherer, National Ice & Cold Storage Co.; Program Chairman, C. H. Purkiss, Pacific Fruit Express, and Membership Chairman, John H. Mairs, Pacific Fruit Express.

Members of the chapter also voted to give the secretary-treasurer $25.00 for a Christmas present for which he expressed his thanks for such a generous gift. The meeting closed with the usual pot of gold and lunch.—H. O. BONTER

Midsouth Reviews Fundamentals of Refrigeration

MEMPHIS — Tennessee Chapter No. 1, NAPRE, was fortunate in having as its president a very competent instructor in J. H. Robinson. In the absence of H. L. Todd, at the chapter meeting of November 7, Robinson substituted with an open forum on Fundamentals of Refrigeration. He used the blackboard to put over his talk. Robinson went on to point out how the principles of refrigeration are necessary to understanding the mechanical equipment used to produce refrigeration. He described the physical laws operating within the mechanical equipment and how the mechanical devices control these physical laws, especially those pertaining to heat and its effect.

NAPRE member Harry H. Simpson of this chapter earned an all expense trip to Paris, France for his wife and himself, it was announced at this meeting. Simpson is a franchised General Electric Company dealer. He turned in the greatest sales and installation for air conditioning equipment during the past season, which won this trip abroad.

Here's what Simpson had to say about the trip: "I won a General Electric trip called Holiday in Paris by selling more packaged air conditioning units than they had set as a quota.

"Helen and I were flown to New York, spent the night at the Belmont Plaza. Attended a welcome party at the Waldorf Astoria, had dinner and saw the floor show at the night club, Latin Quarter, and boarded our trans-Atlantic plane at noon next day at Idlewild Airport. At 7:45 next morning we were in Paris.

"We stayed at the Hotel Claride for 5 days and had bus tours daily to Fontainbleau, Versailles, and other spots of interest including one around Paris to the Eiffel Tower, the Arc de Triomph, The Louvre and the National Library.

"At night we were entertained at the Follies Bergere, the Moulin Rouge, the Paree, and we dined one night and stayed for the floor show at the Lido. We then flew back home. Although the trip was short and we got back tired, we had seen a lot and it was quite an experience."

At this same meeting Wiley H. Flanagan, engineer, Federal Reserve Bank Building was elected to membership.

At the November 21 meeting, Instructor H. L. Todd talked on Section 14 of the Guy King course which covers Operating. He took up such items as maintaining required temperatures, getting required results economically, safely, and plant maintenance. —CHAS. CONLEY.

Oil Traps and Gas Purgers Kansas City Chapter Topics

KANSAS CITY — Expansion valves was the topic for the refrigeration classes of the October and November meetings of the Greater Kansas City Chapter. However, the speaker's presentation at the October 2 meeting covered "Discharge Gas Oil Separation and Non-condensable Gas Purgers". Gene Preston, a chapter member was the speaker. On the refrigeration lesson, Chapter 4 of Basic Refrigeration, A. C. Boyd substituted as the instructor in the absence of John Muller. The meeting was held as usual at the Federal Cold Storage Building.

The chapter skipped its regular meeting on Tuesday, October 16, and met instead on October 17 for a tour of the Westinghouse Repair Shops in Kansas City. Members not only had the opportunity to witness first-hand the repairing of industrial motors, but also observed repairs and alterations to steam turbines and air handling equipment.

The expansion valve topic was continued at the November 20 meeting, there

having been no meeting on Tuesday, November 6, Election Day. Thermostatic types of valves were discussed, with participants citing their experiences and applications of this type refrigerant flow control. The instructor advised that the Sporlan Valve Company, a new Industrial Member of NAPRE, would have a representative on hand at the December 4 meeting to augment the class presentation on thermostatic valves and their operation.

Following the class instruction, Chapter President Leland Kenagy, who is also National Treasurer, gave a brief report on the NAPRE convention held at Detroit. He also called on Lonnie Farris for a report on the Dairy Convention at Atlantic City. The By-laws Committee presented its report at this meeting and after considerable discussion the By-laws recommended by them were adopted and will now be referred to the national office for approval.

The nominating committee consisting of Lonnie Farris, Wm. Maiden and Haskell Brown submitted a slate of officers recommended for 1957. Nominations were then opened from the floor and the following officers were elected unanimously: President, Leland M. Kenagy, Railways Ice & Service Company; Vice-president, V. W. Crocker, City Products Co.; Secretary, John Muller, Railways Ice & Service Company; Treasurer, J. L. Edwards, Armour & Company; Sergeant-at-Arms, Chester L. Rose, Railways Ice & Service Company and Director for one year, Ed. Fraser, Central Packing Company, and for two years, Robt. E. Clark, Inland Cold Storage Company. After consultation with the executive committee, President Kenagy announced the appointment of A. C. Boyd as Chairman of the Educational Committee, J. L. Edwards, Membership Committee, D. D. Clark, on the Auditing Committee and Wm. E. Maiden, Nominating Committee Chairman.

Wm. Maiden, John Schwab and Bob Clark were appointed to take charge of a proposed ladies' night to be held about January 8, at which time the new officers will be installed.

Rocky Mountain Chapter Holds Valve Discussions

DENVER — Refrigerant expansion valves were the subject of the refrigeration session at the October 23 meeting. President Mike Bistranin performed as the chapter instructor. He backed up his presentation by distributing literature on Sporlon valves. He also brought sample valves to class and passed them around for examination. Uses and applications of the various type of expansion valves were discussed.

At this meeting the chapter elected its officers for the 1957 term. Most of the officers were re-elected for another term. The new officers are President, Mike Bistranin, Safeway Stores; 1st Vice-president, Al Nazarenus, Beatrice Foods; 2nd Vice-President, Frank DiDonoto, Safeway Stores; Secretary, Gerald Hoekstra, Rexford Pre-Pakt; Treasurer, Marcus Florida, Safeway Stores, and Sergeant-at-Arms, Charles Beals, Beatrice Foods.

Committees and chairmen will be appointed at the next regular meeting, according to President Bistranin. The October meeting was held in the Barnum Women's Club, which should provide a laugh for our NAPRE brothers over the United States. —G. Hoekstra.

Stockton Chapter Expands

MODESTO—This small chapter membership trophy winner recently held election of officers. Leaders for 1957 are: President, Guy Vancleave, Santa Fe Railway Ice Plant; Vice-President, Walter Nehring, Fresno Consumers Co.; Secretary-Treasurer, H. C. Dyer, Ice Plant; Sergeants-at-Arms, Denis Desjardins and M. T. Clark, Pacific Fruit Express Co.

Committee chairman appointed were Jay Jackson, Fresno Consumers Co., chairman of the membership committee; T. R. Hornbacker, Turlock Refrigerating Co., chairman of the educational committee. Assistants to Hornbacker are J. Panizza, Stockton and W. Menkkinen, Modesto.

Stockton-Modesto was very pleased to capture the small chapter award. It served as an inspiration to the chapter to sort of spread out. The membership and educational committees are planning now to make what the national membership chairman termed "a tale of two cities", actually, "a tale of three cities". The chapter intends to expand in the direction of Turlock, California, as will be noted in the appointment of a chairman of the educational committee, who is located in that city.—H. C. Dyer.

Tacoma Elects Officers

TACOMA—Washington Chapter No. 2 met on November 7 and elected officers for the coming term. The new president is Merle Halley, Heidelberg Brewery; Vice president, Clarence Mase, Carstens Hygrade Meats; Secretary-treasurer, Jim Bennett, Tacoma Ice & Cold Storage Company.

The chapter meets the first Wednesday of the month at the Tacoma Public Library in the Fireplace Room. The chapter instructor for the coming year will be A. L. Waterbury, past president of the chapter, and chief engineer of the Heidelberg Brewery. Membership chairman is John H. Moyer, also a chapter past president, who is with Hooker Electrochemical Co.—Jim Bennett.

Northwest Leaders Hospitalized

YAKIMA—Reports from the NAPRE Chapter at Yakima for November were made by the Chapter president. At the November 28 meeting the membership took cognizance of the fact that a number of their officers were hospitalized and voted to show their appreciation and volunteer some assistance in the form of paying their leaders' per capita dues for 1957. Yakima members voted to pay the dues of Galen Sutton and Harry Dodsworth, secretary and membership chairman, respectively.

Sutton, who is chief engineer of the Yakima Fruit and Cold Storage, was hospitalized after a slight stroke, but is back on the job, and Dodsworth, who is chief engineer of the Yakima Valley Memorial Hospital, had an opportunity to sample the service of his own institution with a kidney operation. Rather than send flowers or some such remembrance, the chapter thought it better to handle these gentlemen's dues for the coming year.

The chapter is back at work on its refrigeration course and fall program. Kenneth Otteman has been serving as chapter instructor. He is inspector for the General Casualty & Insurance Company. Subject matter under discussion at the November meeting was flooded systems and the advantages of recirculating refrigerants.—Elmer Toop.

Well Known Northwest NAPRE Member Passes

SEATTLE—One of the unhappy duties of the chapter secretary is to report the passing of a senior member like William E. Stone. He joined the chapter in July 1927; almost thirty years of membership. His son is associated with him in his firm, the W. E. Stone and Co. Inc., and like his father is one of Washington's Chapter No. 1 loyal members.

William Elmer Stone, president of W. E. Stone and Co. Inc., refrigeration contractors, died suddenly Thursday at his home in Seattle. Mr. Stone was born in Brewer, Maine, and was graduated by the University of Maine in mechanical engineering in 1907. After his graduation from college, he moved to Wenatchee and in 1923 he came to Seattle where he founded the company that bears his name.

He was a member of Seattle Rotary Club, American Society of Refrigerating Engineers, National Association of Practical Refrigerating Engineers, the Arctic Club and the Masons. Surviving are his widow, Beulah, a son, William C. Stone, Seattle, a sister, Mrs. Carolyn Stone, Farmington, Me., and three grandchildren. —John Grainger

Supervisory Data Centers, Insurance, Chicago Topics

CHICAGO—November meetings of Chicago Chapter, NAPRE, featured speakers on control centers for automatic refrigeration and air conditioning systems, insurance underwriting and inspection service. Erwin Slepicka, Minneapolis-Honeywell, handled the discussion on the Supervisory Data Centers, the name by which control centers have become known, and Telford Gorr, American Guaranty and Liability Insurance Company, as the speaker on insurance aspects.

It was at the November 13 meeting that Mr. Slepicka reviewed for the members three kinds of control — electric, pneumatic and electronic. He explained the inherent advantages and disadvantages of each, very briefly, and then went on to detailed application of electronic controls. Supervisory Data Center, he explained, was the name applied by his firm to central control stations which not

only provided finger-tip operation of machinery but actually supervised automatic equipment operation to the extent of providing instruments for checking and recording of temperatures, pressure, etc. By means of colored slides he showed photographs of such installations in central station refrigeration and air conditioning plants. Schematics were also shown by means of slides indicating how air systems, refrigerant systems, condensing water, etc., were supervised by the data center.

At the first November meeting, instruction on the Guy R. King text, Basic Refrigeration, complete package system chapter, was given by Don Rosenbloom of the New Air Conditioning Co. Rosenbloom continued his discussion on this chapter at the November 27 meeting.

At the second November meeting speaker Telford Gorr gave a few pointers on boiler maintenance, relating to the members some of his experiences that had to do with accidents resulting from boilers that were poorly maintained. He also told some of the different tasks which a insurance representative has to do when inspecting a boiler or a refrigeration system. He presented a movie on "Welding and Pressure Vessels". The section of the movie pertaining to welding illustrated the tests that must be taken to become a certified welder.—BILL O'REILLY.

Former Member Passes

DAN M. STUMP, 65 a pipe-fitting instructor and a Chicago public high school teacher for 28 years, died in late November. He had been a member of NAPRE since 1929. Mr. Stump of 546 N. Cuyler Av. Oak Park, Ill., taught in Washburne Trade School, 1255 Sedgwick. He formerly was on the faculty at Austin High School. He was a fellow in the Royal Microscopic Society and was an expert in the field of photography through a microscope. He published a book on the subject. Among the survivors are his widow Eloise; two daughters, a son, and three grandchildren.

Vacuum Cooling Plant Attracts Los Angeles Visitors

OXNARD—An all-day field trip to inspect a new $75,000 vacuum cooler—the first ice condensing vacuum cooler in operation—and other ice making and freezer facilities of the Union Ice Co. at Oxnard, California, on Saturday, November 24, was sponsored by California Chapter No. 2. Los Angeles. For the first time, wives of Los Angeles NAPRE members were invited to a field trip and a dozen or so of the ladies took advantage of the opportunity.

Eight automobile loads of Los Angeles members, guests and their ladies made the 60 mile trip to Oxnard in Ventura County. For safety reasons, no attempt was made to hold the cars to a caravan formation. Individual carload groups met at agreed points, arriving at the rendezvous, the vacuum cooler on Third Street in Oxnard, before noon. Later in the afternoon, the NAPRE group and their ladies had dinner in the Colonial House, a well-known eating spot in Oxnard, the climax to a most enjoyable combination educational and social field trip.

Visitors were guided through the various buildings and installations in two separate groups. The first group of about 25 was taken through at 11:00 a.m. On hand as guides and to explain the technical design and operation features of the machinery were: M. C. Archibald, Union Ice Co. manager at Oxnard; Thad Berg, chief engineer of the Oxnard area, and R. L. Maple of Los Angeles, superintendent of operations for the firm's southern division.

The inspection tour included in addition to the Union Ice Co.'s new vacuum cooler, Factory No. 49 (ice plant), Factory No. 89 (0 F frozen storage), and the vegetable processing facilities of the Stokely-VanCamp vegetable processing plant which adjoins the freezer storage plant, the latter two about a block distant from the new vacuum cooler.

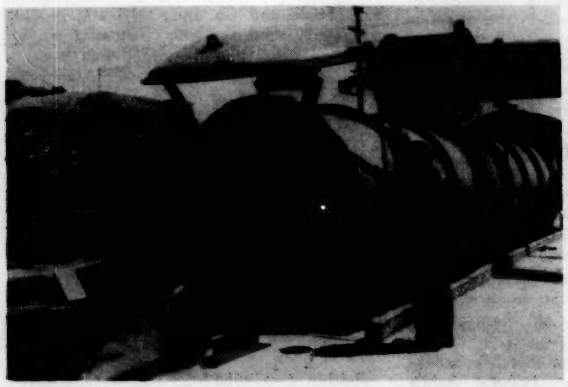


Fig. 1 — Original pilot plant ice-condensing vacuum cooling unit at Union Ice Co., Oxnard, was scene of Los Angeles Chapter NAPRE field trip. This retort being loaded with a half-car of lettuce will pull 70 F product to 34 F in 30 min.

Fig. 2 — Loading the 100 block capacity ice condenser. Each cycle of cooling consumes approximately three tons of ice. In operation, a rotary vacuum pump reduces the pressure in the retort. Vapor, boiling at the lower atmosphere which produces cooling effect, is condensed on the "ice-fired" condensing tubes.

Fig. 2 — Receiving shed used by Union Ice Co. for sheltering produce prior to vacuum-cooling. A retort dolly, loaded, awaits cooling while the previously cooled half-car-load is placed in ice-cooled refrigerator cars.

Witness Vacuum Operations

Highlight of the trip was, of course, the new vacuum cooler which was described by the Union Ice Engineers in on-the-spot descriptions and demonstrations. The NAPRE visitors were permitted to view an entire cycle of operation from the loading of the produce into the 43 foot long product retort, the loading of the ice condensers, and the unloading of the product retort after the cooling cycle.

Latest Design Cooler

This vacuum cooler is reported to be the latest design in this form of chilling facility, and according to its operators has no parallel in operation anywhere at the present time. It was constructed and patented by Associated Refrigeration Engineers of Los Angeles. NAPRE visitors were given the technical and dimensional features of the cooler, as follows:

Cooling capacity of the unit is one carload of lettuce per hour including the time required to load and unload the product tube. It is designed for operation at initial temperature of 70 deg. F, and final temperature of 34 F. Retort of the vacuum cooler is 7' 6" in diameter and 43 feet long. The ice condenser is nearly the same diameter and 30 feet in length. The vacuum pump is a 125 hp. Fuller rotary compressor. The cooler operation is fully automatic.

Photos show the product (lettuce in this instance) in the retort ready for cooling (see Fig. 1). A general view of the receiving shed is seen in Fig. 2 with the product ready for the next cooling cycle. Fig. 3 shows the ice condenser being charged. The capacity of the ice condenser is approximately 20 tons, and the ice melting rate approximately 3½ tons per hour, based on 70 deg. F lettuce.

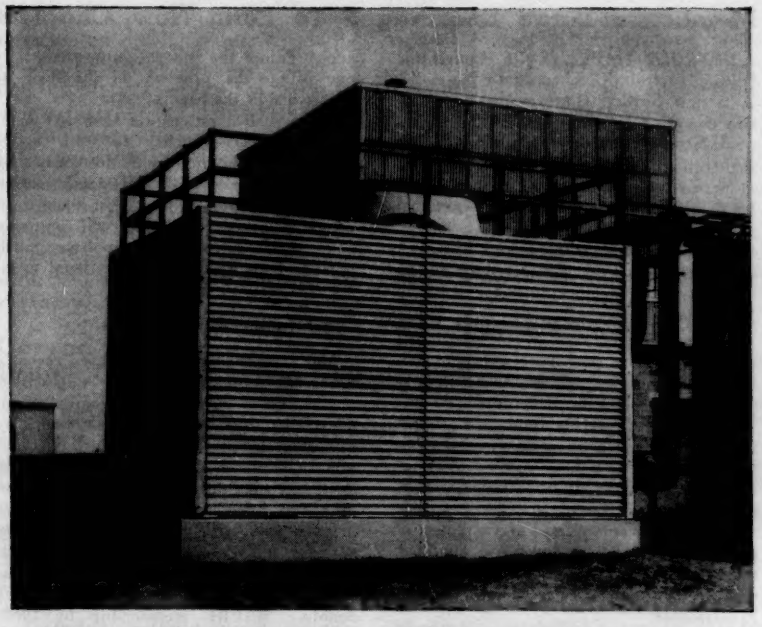
Other Plants Described

From the new vacuum cooler the tour led into Union Ice Co.'s Factory No. 49. This ice making plant is one of Union's older facilities but was completely rebuilt in 1946. It has a daily ice production capacity of 175 tons. It is equipped with 14 compressors; 7 York 2-cylinder 10 x 10's, one Frick 4-cylinder 11x 10, two Baker 10½ x 10½'s and four Pennsylvania booster compressors in the 17 x 10 size. The plant has three tanks; one equipped to handle a full row of 30 cans at a time, and two tanks with a 6-can lift each.

In connection with Plant No. 49 there is a 24-car icing dock island which ties in with the operations of the adjacent plant of the Stokely-Van Camp Vegetable Processing Co. This plant has a zero storage capacity of 500 tons on a 1400 hp connected load. Union Ice Company does the vegetable freezing for Stokely-Van Camp on an average of 90 tons of vegetables per day.

Inspect Plant 89

Next to be toured by the NAPRE group was Union Ice Co.'s Plant No. 89, which adjoins the Stokely-Van Camp facility. Plant No. 89, according to facts presented on the tour by Chief Engineer Berg, was completed by Union Ice Company in 1952. It is a zero storage plant with a 542,000 cu. ft. capacity, or 3,600 tons of frozen vegetables. It is an all fork-lift operation. The main refrigeration units which the NAPRE members inspected were a Vilter V-8 booster compressor, one Fuller Rotary compressor, and one Vilter V-6 second stage compressor, with evaporative condenser and associated auxiliaries.



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Members-at-Large Encouraged To Form New Chapters

DETROIT—NAPRE's 47th Convention held in Detroit, October 29 to November 2, is now history. However certain statistics compiled in connection with this annual meeting are very enlightening. The registration list shows 17 more members-at-large in attendance than at any of the previous postwar meetings. The national officers are interpreting this as an increased interest on the part of engineers in their occupation, possibly brought on by the more technical developments in the field.

The number of new Members-at-Large reported for the past year by the membership committee shows a substantial gain in this classification over previous years. The fact substantiates the theory that engineers are showing increased interest in improving their competency and efficiency. However, it was the concensus of the NAPRE Board of Directors that many members-at-large are overlooking the fact that the best advantages obtained through their NAPRE membership comes as a result of joint effort; namely, chapter participation.

Convention attendants from among the independent member-at-large status, learned at the Chapter Clinic how simple it is to go about the formation of a chapter. Further, they learned how organizational or administrative chapter problems can be brought to an annual meeting and placed before a clinic. Other chapters who experienced such problems are ready and willing to advance some solutions. Moreover, even the more experienced chapters are helped by ideas swapped between chapters in this sort of a forum. That alone should give encouragement to these participants to return to their local areas convinced that a chapter in their locality could be even more helpful to them and that assistance for their chapter is readily available.

Besides renewals of some old friendships and making new acquaintances, members-at-large in attendance at Detroit had the opportunity to get their engineering questions or problems answered. Many times questions have bothered individual members for a long period of time, only to arrive at a national convention and find other members with similar headaches. Before the convention is over someone brings the problem on the floor or before one of the panels.

When such questions are answered members go home or back to work better equipped to do their job. Moreover, they go back with a will and determination to form a chapter in their own home town where a monthly meeting will probably help them solve their problems much quicker than waiting for a national meeting from year to year.

Asks Membership Activities

Many members-at-large have recently requested literature and application blanks. From outward appearances it appears that they have friends or associates interested in joining NAPRE. If the national officers or other chapter officers can assist by building a fire under these lukewarm prospects, it is hoped that the independents will communicate with the national office for just such assistance. The Associations national board of directors has established an objective of doubling NAPRE membership by 1960. It is not too big a job when the potential is considered. Each member-at-large bringing in one new member should certainly inspire the chapters to match such a record.

To repeat a couple of the points brought out at the Chapter Clinic at the convention, it takes only 10 Active members to form a chapter. That means an aggregate of about 20 Active and Associate members in the group. Only three meetings per year is the minimum established by the national body in order to hold a charter once one is obtained. That means, with the summer months out for vacation and heavier work loads, that the chapter would only have to meet a bare minimum of once a quarter for the other three seasons.

Venemann Fund Contributions

Another activity of the Members-at-Large at the national convention which was very inspiring, were the voluntary contributions to the Venemann Memorial Loan Fund. Leading the contributions were Clifford P. Shupe and Donald F. Shuffler. The Venemann committee is much indebted to the leadership of these two Members-at-Large and has expressed hope that other Members-at-Large will make their voluntary contributions—ROY T. BURNS.

A good time to make these contributions would be in connection with payment of annual dues. Invoices were circulated to all members during the month of December. Three Members-at-Large couldn't wait for their invoices to arrive. The first remittance received in the national office was from F. G. Minister of F. C. Lovelock Pty. Ltd., Sydney, Australia. He was closely followed by Curtis A. McKeeman, Portland, Oregon. Walter J. Mikker of Columbus, Ohio, was the other party.

New Products Announced For Air Conditioning Show

NEW PRODUCTS in large numbers are being prepared for display at the 13th International Heating & Air-Conditioning Exposition. The Exposition will be held at the International Amphitheatre in Chicago, February 25 to March 1, under the auspices of the American Society of Heating & Air-Conditioning Engineers, whose annual meeting will be held at that time. It will produce the greatest variety of exhibits ever assembled for such an exposition, as well as the greatest number.

The demand for heating, ventilating and air conditioning equipment is extraordinary because no simple engineering formula will satisfy it. It defies the standards of demand that govern many other markets.

Heating and air conditioning requirements vary from one locality to another according to differences in climate and in the occupations and living standards of the people. The needs of industry are even more varied and exacting.

Information about the forthcoming exposition indicates that specific equipment for specific needs is being developed more rapidly than ever before.

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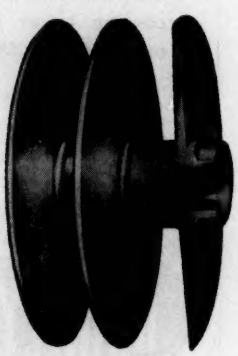

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City Products Corpn., Buys California Ice Facilities

WILLIAM J. SINEK, Chairman of City Products Corporation, announced that with the company's entry into the state of California, City Products operations now extend from coast to coast and from border to border, as well as in Canada and Mexico.

Mr. Sinek said an agreement has been reached with Imperial Ice Division of California Electric Power Company for the purchase by City Products of all the ice manufacturing and distributing assets of California Electric Power Company in the Imperial Valley of California.

These consist principally of two large ice manufacturing plants located at Brawley and El Centro in the heart of the perishable shipping district of the Imperial Valley.

It was also announced that an agreement has been reached with Shippers Ice Company of El Centro for the purchase of its ice manufacturing and storage properties together with a number of vegetable packing sheds at El Centro, California.

These acquisitions, which will operate as Shippers Ice Division City Products Corporation, will provide refrigerator car icing service to the Pacific Express Company, refrigeration to Shippers Service Company, as well as serving the individual needs of shippers who pack perishable products.

The Imperial Valley operation will be under the management of Mr. Thomas B. Henderson, long associated with Shippers Ice Company, with Mr. Kenneth J. Savage as assistant manager.

Conrad Hilton Hotel to Install Air Conditioning

A LARGE air conditioning system, said to be the biggest in the hotel field, will be installed in the Conrad Hilton Hotel, Chicago. All 3,000 of the guest rooms will be air conditioned under a contract with York Corp., at a cost of $3,000,000. Completion has been set for September 1957.

Included in the contract are two 800 horsepower York Turbo Water Cooling systems, capable of chilling 5,000,000 gallons of water per day, and over 3300 York Induction air units for location within the hotel rooms through which the chilled water will be pumped and circulated from the basement to the top twenty-ninth floor. These units provide individual control of temperature, positive ventilation and operate at a low sound level with no odor or bacteria transmitted between rooms.

Preliminary Planning

Months of planning and work have already gone into this program. The hotel has set up a completely new air conditioning department, and members of the hotel's staff have been assigned to work with the some 150 engineers and mechanics of York Corporation. York has assigned L. E. Anderson, their General Construction Superintendent in Chicago to coordinate the project.

The heart of the system will be the refrigeration unit in The Conrad Hilton's third basement, but the giant task will be installing 95 riser systems from the attic down through the hotel to the fifth floor. Each riser system involves three components: a drain line, a chilled-hot water supply and return line, and a conditioned air supply duct.

York's eventual construction crew will include approximately 60 steamfitters, 40 sheet metal mechanics, 20 electricians, 15 insulation mechanics, and six temperature control mechanics, all from the Chicago area.

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The equipment and materials will fill many freight cars. Over 150 tons of steel will be used in the installation, much of which will go into several miles of special round air ducts and connecting fittings. There will be over 15 miles of copper and steel piping, 126,000 square feet of Met-L-Wood in which the air ducts and water lines will be encased, in addition to the refrigeration and air conditioning machinery and accessories.

Placing Heavy Equipment

Bringing in the heavy equipment with which to work will be a gigantic operation in itself. But the plans have been effectively and efficiently organized, because time is of the essence since the hotel will be spending $15,000 per day on this project. The major problem, other than design drafting and planning, will be the distribution of the equipment and materials.

A project of this size would be a gigantic task in itself, but it is doubly perplexing in a hotel. The Conrad Hilton is running about 90% occupancy; and therefore, the problem of putting rooms out-of-order for this installation is intricate. The working schedule plans include between 60 and 180 rooms out-of-order per day; but York Corporation, working closely with The Conrad Hilton's Rooms Division, will enable night occupancy in these rooms during critical periods. Plans have also been made by the hotel's housekeeping department, carpenter shop, and rehabilitation department to completely protect the room furnishings.

Actually, the installation of this air conditioning system will greatly improve and modernize The Conrad Hilton guest rooms. The old-fashioned radiators will be completely removed, and in their stead will be new style York induction units that provide both heating and cooling.

Ice Drivers Go 21 Months Without Chargable Accident

IN THE fast growing city of Austin, Texas, if an ice delivery fleet can operate 21 months without a chargable accident, they are doing pretty good. That is just what the drivers of Southland Corp., accomplished as of October 1, 1956.

This was recognized at a safety award presentation November 9, at which a gold plaque was presented for 351,438 accident-free miles travelled by this fleet of trucks. The safety program under which this award was made gives credit to the care and maintenance of trucks, including inspection of brakes to see that they are in perfect condition at all times. Attitude and teamwork of the drivers also is a factor.

Formal presentation of safety award to drivers of Southland Corporation, Austin, Tex. In the picture are Glen Hans, ice route superintendent; C. D. Parsley, manager ice department; W. F. Leonard, Jr., Insurance & Safety department, Dallas; Wilmer Hanson, paint and body man; Charles Ewinger, head mechanic.

Trends in Transit Cooling

(Continued from page 20)

will the proportion of total fresh perishables traffic moving by truck-trailer. Piggybacking of truck-trailers loaded with fresh perishable foods under mechanical refrigeration is coming, but should a satisfactory trailer be developed incorporating ice-salt refrigeration, this could secure a large part of the market, since better humidity conditions can be maintained with ice. The mechanically refrigerated rail car will gradually supplant the ice-salt bunker car in the movement of frozen foods. Your industry should encourage and be keenly interested in all efforts of the railroads to speed up their fresh and frozen perishable food cargoes from shipper to receiver.

This will help to assure a continuing large movement in ice-bunker cars where a major part of transport ice is used. After all, water ice has a number of important advantages: It is a positive refrigerant; it carries a high degree of humidity, which is important in maintaining the freshness of foods; it is easy and simple to use; costs of maintenance of the facilities in which ice is used are moderate; and, it is widely available. It seems that a program of research by your industry is in order.

Refrigerated Unit For Small Freight Shipments

(Continued from page 22)

land (Ill.) area. Special rates schedules, competitive with trucks, will be in effect for the new type less-than-carload freight movement.

The design of the "Convert-A-Frate" refrigerated cargo unit incorporates a new construction concept for railroad equipment. This is the "sandwich-type" panel fabrication utilized by the aircraft industry. The single-section panel sides and roof of the 17 x 8 x 8-foot unit are made of 5¾ inch flat-grain balsa cores faced with ⅛-inch type 1002 isotropic "Scotchply" reinforced plastic skins. The floor is a 2¾-inch flat-grain balsa core surfaced on the top with plywood and ¼-inch isotropic type 1002 "Scotchply" reinforced plastic, and on the bottom with ⅛-inch of the same type plastic.

This means a lighter cargo box, a thermally more efficient box, and a structure that without conventional framing will meet all railroad requirements for equipment that can withstand the roughest kind of vibration and shock.

N.A.I. Convention

(Continued from page 25)

Olin Mathieson Chemical Corp., Forest Products Div., Atlanta, Ga.
Perfection Ice Scoring Machine Company, Fort Worth, Texas.
"Refrigeration", Atlanta, Ga.
Refrigeration Engineering Company, Montgomery, Minn.
Ryan Refrigeration Company, Minneapolis, Minn.
S & S Vending Machine Co., San Jose, Calif.
Shippers Equipment Manufacturing Co., Pharr, Texas.
Sisco Products, Inc., Buford, Ga.
Southern Advance Bag & Paper Division of Robert Gair Company, Inc., Boston, Mass.
Union Bag & Paper Corporation, New York, N. Y.
Vivian Manufacturing Company, St. Louis, Mo.
Warren Company, Inc., Atlanta, Ga.

Association Secretaries Hold Annual Meeting

THE annual meeting of the Unit Association secretaries was held in two sessions: Monady afternoon and Tuesday forenoon, culminating in a luncheon Tuesday noon before the formal opening of the convention program.

At the Tuesday session, Mrs. Edna Vaughn amplified her treasurer's report by calling for an increase in dues to meet necessary expenses of $10.00 a year, and a motion to do this was adopted.

Individual reports of activities by the associations were presented, covering industry safety work, local conventions, merchandising, sales meetings and other activities. These reports showed active programs of work, participated in generally by the members. In this discussion it was brought out that there seems to prevail a more optimistic trend, largely due to the success of the new merchandising. Another healthy sign, it was mentioned, is that prices for prepared ice are advancing along with other commodities.

Suggested by Robert Walton, plans were initiated for a bulletin to be issued at periodic intervals, keeping members of the group informed on what all associations are doing. The details of this new bulletin will be worked out by a special committee.

Guy W. Jacobs, representing the National Association of Ice Industries, also welcomed the secretaries and said the National Association has long appreciated their cooperation. Wm. T. Jobe, legal counsel, reporting on conditions in Washington, said that the present administration would continue friendly to business interests and while Congress will still operate with a democrat majority, it is expected that the President will be able to work satisfactorily with a coalition of the two parties.

Officers were re-elected for 1957: Robert Walton, Indiana, president, and Mrs. Edna Vaughn, Delta States, secretary-treasurer.

Booklet on Fire Safety

A BOOKLET "Recommended Safe Practices for General Storage" has been issued by The National Fire Protection Association, 60 Batterymarch St. Boston, Mass. Although designed for merchandise storage, it has information of general interest to refrigerated warehousing. In the introduction it states that the principles set forth will provide a basis for proper protection of commodities in storage whether located in warehouses, other type buildings or in the open. Of special interest to refrigerated warehousemen is Part C, dealing with refrigerated warehouses covering structural details, fire protective devices, storage arrangement, and equipment.

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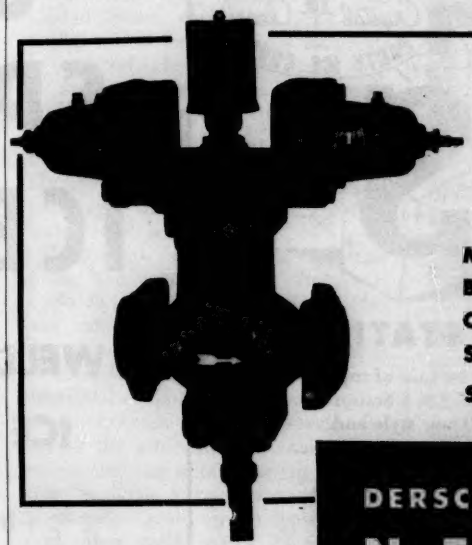

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Refrigerating Plant Failures

(Continued from page 35)

The receiver did not have a relief valve, only a soft plug. There was no opening provided for a relief valve. However, the inlet and outlet lines were copper and were brazed into the vessel. He stated that those lines, being brazed, should have been soft at those points and should have broken before the weld on the receiver. There was neither code nor working pressure stamp on the receiver.

"The system was of 80 tons, and they were pumping the gas out of the lines and out of the evaporative condenser which is located approximately 80 ft. from the receiver. They were using an auxiliary compressor of 3 hp capacity to pump out. The reason for pumping out was to repair a leak therein. The refrigeration man stated that the system had been pumped down in this fashion two or three times earlier this season to repair the lines, and therefore they had no reason to believe anything like this would happen.

"There was *no high pressure gauge* on the small auxiliary compressor, *nor was there a high pressure safety switch.* The system held approximately 600 lbs. of Refrigerant-22 with full charge. Fortunately, there was no one hurt when the end of the receiver blew off and flooded the basement with refrigerant, but some of the workmen were slightly overcome for lack of oxygen by the time they got out. After looking into the situation and checking some capacity tables of receivers, I am shocked at the above facts and figures."

Include Training For Chief

Supervisory engineer for the larger plant should also be included in the training program, of all refrigerating industries. His experience and knowledge of refrigeration, air conditioning, power, etc., should be supplemented with basic reading and study of other machinery used in the processes employed by the business. Most important, he should be schooled in the fundamentals of building construction.

Even though others licensed for such work are primarily responsible, the chief or supervisory engineer is often more cognizant of associated dangers or potential losses. When a wall at a meat packing concern adjacent to new construction collapsed, it brought down steam, water, natural gas, electric power and ammonia lines. Losses included 142 freshly slaughtered hog carcasses (see Figs. 5 and 6).

As indicated by the headline to this article, the Educational Committee, NAPRE believes that management should play a big part in the prevention of such derangements. First step could be an inquiry into how actively a firm's own engineers participate in the local NAPRE educational program. For the year 1957, NAPRE has this program to offer management in refrigerating and air conditioning fields[6]:

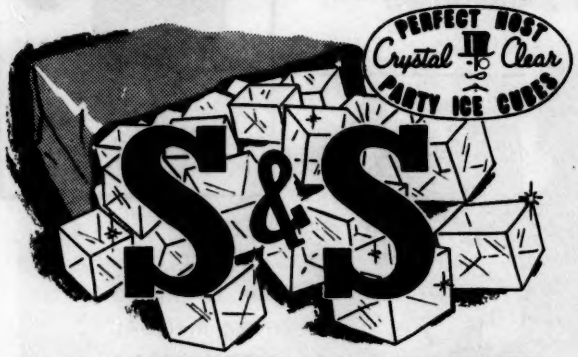
NAPRE's '57 Education Program

Through the pages of its official organ, INDUSTRIAL REFRIGERATION, the Association will continue its series on *operating and maintenance* which was started in 1956.

Through NAPRE Chapters, the Association offers to conduct *refrigerating engineering classes* for newcomers to the game. These classes are under the supervision of experienced operators and in many cases professional instructors.

[6]See also "From the President's Desk: Bert C. McKenna, President, NAPRE, Nov '56 Industrial Refrigeration, Page 39.

28 Years Service to the Ice Industry



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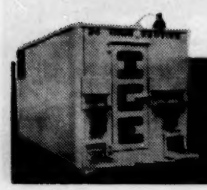

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Class instruction at the chapter level is under the guidance of Guy R. King, author of BASIC REFRIGERATION, the official text of NAPRE. King supervises chapter educational programs and has prepared an Instructor's Manual for the use of chapter leaders in teaching BASIC REFRIGERATION.

Also, at the chapter level, NAPRE offers a series of *speakers on refrigeration and allied topics*. Predominantly, the speakers lecture on practical topics; subjects from which the member can draw a wealth of knowledge and information, and which he can apply in his work to improve plant efficiency and operational safety.

The *Question Box* which appears monthly in INDUSTRIAL REFRIGERATION is conducted by Professor Harold P. Hayes. As a rule, the questions presented therein have come up most frequently in the chapters. All chapters conduct a Question Box through which engineer members can receive assistance. Members-at-Large receive the same assistance from the National Educational Committee direct. Also, questions which cannot be handled at the chapter level are referred to the National Committee for assistance.

Papers on *topics of importance* or interest to the practical man are also presented at *regional conferences* which the Association encourages between chapters at various geographical locations. No less than ten and often twelve such papers are presented at the *annual Convention*. (See summaries of talks presented to 47th NAPRE Meeting, Detroit, published in Dec. '56, INDUSTRIAL REFRIGERATION.)

Plan Ten Practical Papers

The INDUSTRIAL REFRIGERATION series which opens with the February issue will consist of ten papers and is aimed at providing four sets of instructions for the operator of refrigerating plants, three discussions of interest and assistance to the maintenance mechanic and two for his counterpart in the electrical field. There will be one presentation specifically written for the chief or supervising engineer.

These are in addition to worthwhile papers or informative literature provided to the Committee by the Association's Industrial Members and circulated through direct mailing. Management can recognize from these suggestions and presentations the extent of benefits offered them by NAPRE through service to their refrigerating engineers. Except for articles in INDUSTRIAL REFRIGERATION and the Question Box, non-member engineers in the Industry cannot derive a great deal more without becoming active in the Association.

Owners can assist NAPRE in putting across this ambitious program by cooperating with their local chapter through an Industrial Membership at that level. Further, they can encourage their engineers both by verbal inducement and with nominal financial aid to become members of NAPRE. Where no chapter exists, management without a great deal of effort, often persuades their engineers to become interested and starts a chapter.

Corrosion In Refrigerating Systems

(Continued from page 18)

after only six months of service, and, thereby disrupted a refrigeration system, is typical of material on display. Another highlight of the exhibit is a continuously operating simulated tower system which provides visual evidence of the effects of treated and untreated water on the metal parts of this equipment.

The exhibit makes it plain that no metal commonly used today in refrigeration, air conditioning, plumbing or heating can withstand the corrosive action of all water, and that even copper can actually be dissolved from brass and copper piping by some waters.

Damage caused by corrosion in water conveying systems in the United States each year runs into millions of dollars. It could be greatly reduced, chemical engineers say, if architects, engineers, contractors and owners availed themselves of modern techniques of water treatment. The progress of corrosion, Mr. Shuldener declares, depends principally upon the characteristics of the water involved.

In certain areas of the country, where the water is hard, that is, it contains large amounts of calcium and magnesium salts, the problem is not so much one of corrosion as it is of scale formation. In such locations, continual evaporation in cooling towers and evaporative condensers increase the concentration to such an extent that the salts come out of solution to form a hard, stone-like deposit called scale on condenser tubes and other metal parts.

Method of Treatment

There are no secrets to water treatment. One of the most widely used and effective treatments for the prevention of corrosion in non-potable

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water is to feed sodium chromate, a chemical which prevents corrosion by forming a thin protective film on the metal. The chromate also acts as a germicide to inhibit organic growths on the water-contacted surfaces, and to prevent the water from acquiring an odor.

To maintain the desired concentration of chemicals at all times in the condenser cooling water or the air washer water, it is Shuldener's contention that the chemical solutions must be fed continuously in a small stream rather than by intermittent dosing. This can usually be accomplished by connecting to the circulating water system a proportioning feed, which assures the introduction of chemical solution in continuous small amounts whenever water is being circulated.

After treatment is begun by a reliable water treating firm, according to this executive, water samples should be collected at regular intervals. An analysis is made to assure that the proper kind and amount of chemicals are being fed (See Fig. 2.)

Treatment in hard water areas consists in regulating the concentration of the calcium and magnesium compounds, and in increasing the solubility of the scale-forming salts.

Frozen Salads

SUCCESS in freezing salads has been achieved by the New Jersey Agricultural Experiment Station, New Brunswick, N.J., according to recent report. The work was directed toward home freezers but may suggest something in the way of commercial application. The chief warning is that mayonnaise cannot be used because it separates. The emulsion of egg, oil and vinegar breaks down and liquid settles. Commercial salad dressing, however, freezes satisfactorily, as does home cooked dressing. Dressings tend to dissipate in the freezer and a short holding period, not over three weeks is recommended. — TRRF Bulletin.

News of PEOPLE

JOHN C. REILLY was recently appointed resident manager of the Tulsa Cold Storage Division, City Products Corporation. George L. Hancock will continue as assistant manager and comptroller.

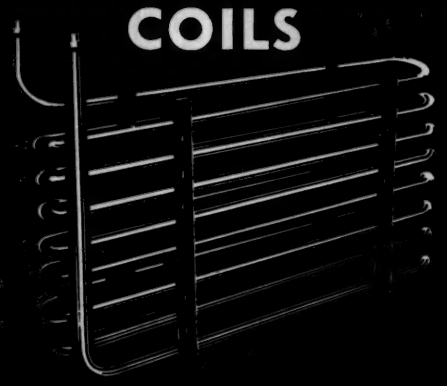
OMAR JOHNSON has been appointed resident manager of the Federal Cold Storage Company, St. Louis, a division of City Products, replacing Col. R. C. Taylor, who has retired after 34 years of service.

WM. HOOVER, assistant to Director Diehl of The Refrigeration Research Foundation has resigned effective in October to join the Corn Industries Research Foundation, Washington, D.C. as manager of the Technical Service Division. Mr. Hoover has been with TRRF since 1953.

WM. T. JOBE, JR., son of Wm. T. Jobe, general counsel for The National Association of Ice Industries has joined headquarters of the National Association of Refrigerated Warehouses as a new special assistant on industrial and legislative relations. In addition to his industrial and legislative assignments, Mr. Jobe is taking on other executive office functions in development and membership service fields.

WILLIAM E. READY, Treasurer of NARW, was official spokesman for the refrigerated warehousing industry recently when NARW paid tribute to the American Meat Institute at the AMI's Golden Anniversary Convention in Chicago. An engraved plaque was presented by Mr. Ready for NARW to John F. Krey, vice-chairman of the Institute's Board of Directors, for "outstanding contributions to the diet and health of America and Americans."

REFRIGERATION COILS



NATIONAL REFRIGERATION COILS have been known since 1883 for the smooth bends, perfect welds and accurate measurements which result only from experienced engineering and exact production.
NATIONAL QUALITY guarantees effective service in all types of NATIONAL COILS, also NATIONAL HEATERS, CONVERTERS & HEAT EXCHANGERS.

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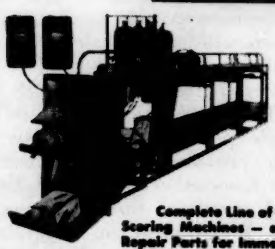

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USDA Buys Frozen Turkeys

FROZEN turkey purchases amounting to 360,000 pounds were made the week of November 23 by the U. S. Department of Agriculture under the special buying program to help producer prices during the heavy marketing season for this year's record turkey crop. Purchases since first buying in late September now total 27,114,000 pounds.

Price ranges per pound for purchases the week beginning November 19 by geographical regions and number of carlots (average of 30,000 pounds) for each region follow: Southeast 39.50 cents for four carlots; Midwest 38.50 cents for two carlots, and Southwest 38.50 cents for six carlots. All prices are on a per pound f.o.b. basis and the overall range was from 38.50 to 39.50 cents per pound. In making awards, consideration was given to area price variations in relation to transportation costs for distribution. In total, bids were received from 7 bidders who offered a total of 690,000 pounds. Delivery of the turkeys purchased in November were during the week beginning December 10. These turkeys will be used in the National School Lunch Program.

Modern Ice Skating Rink

A NEW permanent city-operated ice skating rink has been opened at the Simons Playground in West Oak Lane, Philadelphia, Pa. The rink was built at a cost of $140,000 and will be operated by the Department of Recreation. Measuring 85 by 185 feet, it will accommodate about 400 people with two recreation leaders, several assistant leaders and part-time junior aides to supervise. Refrigeration mechanics will be on duty at all times.

Recreation Commissioner Robert W. Crawford announced the ice rink will be open until mid-March but emphasized that operation is dependent upon the elements and temperature. Tentatively, the rink will be open weekday and Saturday afternoons from 2:30 to 5:30 p.m. and from 7 to 10 these nights. It also will be open Saturday morning from 10 to 12:30 and Sunday from 1 to 6:30 p.m.

Crawford said his future plans call for instruction classes for all age groups, figure skating sessions, formation of skating clubs, ice hockey competition and ice skating carnivals.

COMING CONVENTIONS

INDIANA-OHIO-MICHIGAN ICE ASSOCIATIONS
February 24-27, 1957
Detroit-Leland Hotel, Detroit, Mich.

INTERNATIONAL HEATING AND AIR CONDITIONING EXPOSITION
February 25 - March 1, 1957
International Amphitheatre, Chicago, Ill.

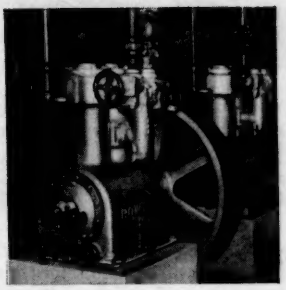
NORTH CAROLINA ICE ASSOCIATION
March 18-19, 1957.
Washington Duke Hotel, Durham, N. C.
Lewis H. Powell, Secy-Treas.

AMERICAN WAREHOUSEMENS ASSOCIATION
April 1-5, 1957
Chalfonte-Haddon Hotel, Atlantic City, N. J.
Wm. Dalton, Secretary

NATIONAL ASSOCIATION REFRIGERATED WAREHOUSES
April 1-5, 1957
Chalfonte-Haddon Hotel, Atlantic City, N. J.
Wm. Dalton, Executive Vice-President

IN REFRIGERATION *it Pays to Know* HOWE

COOL IT —
with one or more of Howe's complete line of modern space-saving automatic ammonia compressors. Sizes — 2 to 150-ton capacity. Built for maximum service with minimum cost.



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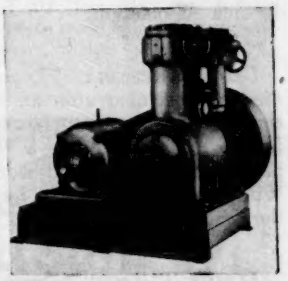
with Howe Booster Compressors. Food freezing techniques to meet today's rigid requirements. Can be engineered and built to your local plant conditions with equipment manufactured by Howe.



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DEATHS

Joseph K. David, Sr.

JOSEPH K. DAVID Sr., president of the Duval Ice and Coal Co. passed away in Jacksonville, Fla., on December 13 at the age of 73 years. He came to Jacksonville in 1899 and will be remembered for his long service in the Southern Ice Exchange as well as a staunch supporter of the National Ice Industries. He was founder of the Florida Ice Association and served as its president from 1935 to 1937. He was made an honorary member of the association in 1955.

He was well known in Jacksonville for his civic, religious and business activities. He was a 33rd degree Mason and a member of the Shrine as well as holding membership in the Odd Fellows, the Civitan Club and was first president of the Syrian-American Club. He is survived by his wife, three daughters and three sons one of whom, Raymond A. David, is the current president of the Florida Association.

GEORGE RENAULT, 77 years old. died in November after an illness of three years. He was plant foreman for the Empire Storage & Ice Company for 42 years and worked for William Rockhill Nelson, founder of the Kansas City Star.

ALBERT T. LIGHT former general superintendent of the York Ice Machinery Corp., died November 2 on his 85th birthday. He headed the dairy division of York for 10 years, from 1929 to 1939. He and Mrs. Light both came to the United States from England at early ages and became naturalized citizens.

MANUFACTURERS' NEWS

Carrier Absorption Specialist

Owen Kuhen

OWEN KUHEN has been named product specialist for Carrier Corporation's large-capacity absorption refrigeration equipment. All of Mr. Kuhen's business career has been devoted to air conditioning using absorption cooling. Carrier produces such equipment in sizes from 60 to 700 tons.

Victor Cole, who has been associated with development and sales of the absorption units, moves to the air conditioning firm's Southwest region. He will be a sales engineer for "big air conditioning" equipment.

Mr. Kuhen is a member of the American Gas Association and the American Society of Refrigerating Engineers. He is known throughout the gas industry.

Reid Named to York Post

John G. Reid

THE appointment of John G. Reid as engineering manager, absorption systems, has been announced by R. K. Serfass, vice-president and general manager of the Industrial Division of the York Corporation, a subsidiary of Borg-Warner. He comes from the Crosley and Bendix Home Appliances Division, Avco Manufacturing Corporation, located in Cincinnati, Ohio. At Avco, he was manager of air conditioning engineering for five years following eleven years as mechanical research engineer on absorption systems at Servel, Inc.

Mr. Reid was born in Pottsville, Pa. and attended Lehigh University, where he was graduated in 1929 with the degree of mechanical engineer. He has been a registered professional engineer in the State of Pennsylvania since 1939; past chairman of the Cincinnati Section of the American Society of Refrigerating Engineers; chairman of the Room Air Conditioner Engineering Committee of the Air Conditioning and Refrigeration Institute, Washington, D.C. and is a member of the Advisory Committee on Military Specifications for the A.R.I.

New "Freon" Price Schedule

IN AN effort to improve credit practices, Du Pont has announced a new discount and price schedule for wholesalers of its "Freon" refrigerants, effective December 1. Prices of the major "Freon" refrigerants at the wholesale level have been increased about two per cent, with a corresponding two per cent discount when the customer pays the invoice within 10 days. The changes apply to all wholesaler order for "Freon-11" trichloromonofluoromethane, "Freon-12" dichlorodifluoromethane, "Freon-22" monochlorodifluoromethane, "Freon-113" trichlorotrifluoroethane, and "Freon-114" dichlorotetrafluoroethane. Prior to December 1, the Du Pont Company's "Kinetic" Chemicals Division had no discount for payment of invoices for refrigerants.

DuPont Opens New Unit

OFFICIAL start-up of the DuPont "Freon" facilities in Antioch, Calif., where construction of units for production of tetraethyl lead anti-knock compound for gasoline also is rapidly nearing completion, took place in November. On December 11, the first bulk shipment of 37,000 lbs (3700 gals) was shipped. It

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REVOLUTIONIZES AUTOMATIC ICE VENDING!

- SENSATIONAL "FOOL-PROOF" VENDOR DISPENSES CUBES, CRUSHED, PARTY AND BLOCK ICE
- LOWER OPERATIONAL COST • TROUBLE FREE • MORE STORAGE SPACE by design
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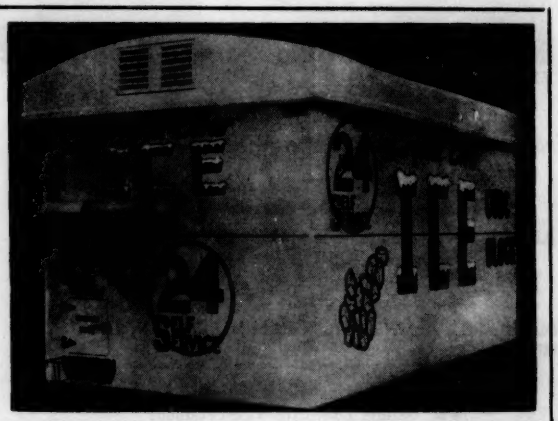
8' x 16' Station Vends
135 — 10 lb. Bags AND
60 — 25 lb. Blocks

8' x 16' Station Vends 135 — 10 lb. Bags AND 60 — 25 lb. Blocks
NEW LOW COST 6' x 8' Station Vends more than 85 — 10 lb. Bags
For complete details, specifications, prices on this Double Unit and other sizes and models or Special Applications Write, Wire or Phone
K. G. BROWN MFG. CO., INC., MATTITUCK, N.Y.



Third, there is a greater demand for

million which Mr. Ramsey regards as

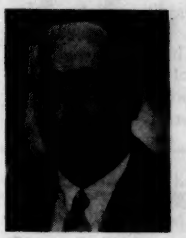
is the fourth U.S. plant producing "Freon" compounds, introduced commercially in 1931 as nonflammable and nonexplosive refrigerants, and used today as the cold-making agent in most home refrigerators, freezers, and air conditioners. Other DuPont plants turning out "Freon" refrigerants and propellents are located at Deepwater Point, N.J., Louisville, Ky., and East Chicago, Ind., with DuPont of Canada, Ltd., operating its own plant at Maitland, Ontario.

Initially the Antioch plant is producing "Freon-11" trichloromonofluoromethane and "Freon-12" dichlorodifluoromethane for use by West Coast aerosol and refrigeration manufacturers and refrigeration maintenance concerns. Other types of "Freon" compounds are being repackaged at Antioch for West Coast distribution.

Borg-Warner Purchases Flakice Patents

BORG-WARNER Corporation and Flakice Corporation announce that Borg-Warner has purchased certain patents from the Flakice Corporation under which Borg-Warner's York Division has been manufacturing ice makers for the production of cubes and other forms of shaped ice. Flakice Corporation retains certain other patents and all its Trade Marks. Each Corporation will, therefore, in the future, manufacture and sell its own lines of ice making equipment independently of the other.

New Vilter Houston Manager



George E. Brenton

THE OPENING of a sales office in Houston, Texas and the appointment of George E. Brenton as district manager of the new office is announced by Vilter Manufacturing Company, Milwaukee, Wis. This new branch, located at 1 Briardale Court will give the firm increased representation to handle the ever increasing volume of business from the state. The Houston office will serve as the center of Vilter operations in Texas and will work with Vilter distributors in the state.

Mr. Brenton has over fifteen years experience in refrigeration and air conditioning as well as a sound foundation in plumbing and heating. Prior to joining Vilter's, he served as assistant to the sales manager of J. H. Lock & Sons, Ltd., of Toronto, Canada. Other positions he held with Toronto firms include six years as branch manager of Canadian Eastland and branch manager of Linde-Hall. A Canadian by birth, Mr. Brenton received his education in public and technical schools, mostly in Toronto, Canada. Since 1951 he has been an active member of the ASRE in Toronto, and plans to continue his affiliation in Houston.

Perlite Industry Sales Reach New Peak

SALES of perlite, a lightweight building aggregate which is replacing heavier sand in plaster and insulating concrete, are estimated to have set a new industry record in 1956 of approximately $13,700,000, up 9.8 per cent from the year before. Output of the expanded volcanic lava, produced by 84 plants in 30 states, is also estimated to have risen by the same amount to 270,000 short tons. The report was made by Richard S. Funk, administrative secretary of Perlite Institute, the industry's international trade association.

For 1957, Mr. Funk predicts an additional 12 per cent increase in expanded perlite sales, estimating an industry volume of approximately $15,350,000. Tonnage is also expected to rise 12 per cent to over 300,000 short tons.

Five major factors will account for the rise in perlite sales, he believes.

First, a higher level of both public and private construction is expected for 1957 and nearly 90 per cent of perlite sales are to the construction industry.

The second factor is the growing popularity of perlite plaster which provides greater fire resistance with less than half the weight of sand plaster. More and more architects and contractors are taking advantage of the fact that this reduced weight permits more efficient application and eliminate useless dead load from buildings.

BASIC REFRIGERATION

By Guy R. King

The Book of

"Refrigeration Knowledge"

29 Chapters—340 ILLUSTRATIONS—526 PAGES COVERING THESE SUBJECTS

- Fundamentals
- Compression System of Refrigeration
- Refrigeration
- Expansion Valves
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- Condensers
- Flow Equipment
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- Defrosting Methods
- Compressor Drives
- Food Preservation
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- Servicing
- Refrigerated Enclosures
- Instruments and Meters
- Heat Calculations
- Humidity in Refrigeration
- Compressor Calculations I
- Compressor Calculations II
- Refrigerant Lines—Pressure Drops
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- Altitude and Its Effect
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- The Refrigeration Code

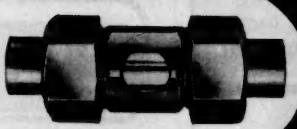
Send For This Book—$6.00

NICKERSON & COLLINS CO.

433 N. Waller Ave., Chicago 44.

NEW! "250" SERIES LIQUID EYE® POSITIVE SEALING INDICATORS

designed to save you even more time and money



The new "250" has all the proved Liquid Eye advantages *plus* these newly engineered features:

- **smaller—more compact, simplified design.**
- **preformed copper extension eliminates need for separate gaskets—*foolproof* installation.**
- **complete, self-contained, economy unit.**

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Write today for catalog covering the complete Allin line.

Allin

ALLIN MANUFACTURING CO.

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Over 1,000,000 Liquid Eyes Sold to Date!

complete refrigeration engineering service

Specialists in —

- Warehouses — Refrigeration and Insulation
- Food-Freezing
- Low Temperature Refrigeration
- Design of
  Non-Frost Heaving Floors
  Frost-Free Vestibules

Backed by a quarter-century of national and international experience, V. C. Patterson & Associates staff of specialized engineers is available to aid you with your refrigeration, insulation, food-freezing, warehousing, and allied problems. For new construction or for renovating present facilities, you'll find our engineered plans will mean greater efficiency and real money-saving operations. What's your problem? Write us.

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Third, there is a greater demand for perlite insulating concrete, particularly for lightweight roof deck construction where it adds insulation, rigidity and fire safety to the deck.

Fourth, significant increases are also expected in the use of perlite as a component of gypsum wallboards, insulation board, acoustical plaster and tile, pipe insulation, and other manufactured products.

Existing mining and processing facilities are believed to be adequate to supply the anticipated increased demand in 1957. Perlite Institute reports that there are now 84 perlite processing plants operated by 72 companies in 30 states. Perlite mines are operated by 13 companies in six western states.

Foreign countries are also showing increasing interest in exploiting their perlite resources. As evidence of this, the Perlite Institute has member companies in Canada, Mexico, Venezuela, Great Britain, Greece, Australia and New Zealand, and expects to add to this list in 1957.

Worthington Net Rises

WORTHINGTON Corp's sales for 1956 will be more than $170 million, a record, and net income "will crash through the $6 a share barrier," Hobert C. Ramsey, chairman, predicts. "For 1957," he said, "we have been building up inventories looking toward volume of approximately $200 million."

The company reported net income equal to $4.58 a share on 1,440,241 common shares for the first nine months of 1956, up from $3.97 a share on 1,310,150 shares in the initial nine months of 1955. All 1955 sales were about $140 million and net was $5.21 a share on 1,313,639 common shares then outstanding.

New orders totaled $100 million for the first six months of 1956, and this figure will be exceeded in the second six months. The backlog of orders now is about $91.5 million which Mr. Ramsey regards as satisfactory. "We can handle nicely any backlog up to about $100 million," he said.

With respect to the company's foreign operations, the Chairman said bookings abroad are now running at a $25 million rate, nearly double 1955's volume. Earnings from this operation also are considerably improved over 1955.

New Borg-Warner Unit

THE Borg-Warner Corporation has organized a new division to co-ordinate sales to major home builders. The division will handle sales for the Ingersoll-Humphryes Division, Reflectual Corp., Norge Sales Corp. and the York Corp.

Briley Named Manager York Rochester Office

George C. Briley

GEORGE C. BAILEY has been named manager of the Rochester, N. Y., office of the York Corporation subsidiary of Borg-Warner, it was announced by Walter L. Pharo, York Industrial Division General Sales Manager. Mr. Briley will be responsible for the sale of York industrial air conditioning and refrigeration products in the upper New York State area including the cities of Utica, Ithaca, Syracuse, Binghamton, Buffalo, Rochester and Niagara Falls. A member of the York Corporation organization since 1949, Mr. Briley served as office engineer and sales engineer in York's Houston, Texas, office until he joined the Rochester office in October, 1956.

CATALOGS AND BULLETINS

Cooling Tower Bulletin

TWENTY-FOUR sizes of quiet-operating cooling towers for business and industry are described in the new 12-page Bulletin 477-A offered by the Binks Manufacturing Company, Chicago. The illustrated booklet explains that the quiet performance of the fans is due to tip speeds under 2300 feet per minute. Squirrel cage blower, motor and drives are located in the dry air stream. No moisture laden air penetrates this vital mechanical equipment in the cooling tower, it is stated. Dimensions and approximate weights are given for each of the 24 cooling towers which range from 5 to 360 tons of refrigeration. Selection tables for a wide range of design wet bulb conditions are also included.

Special Dairy Equipment

SPECIAL equipment for the dairy and allied processing field including ammonia and Freon condensers, "No Frost" refrigeration equipment, room coolers, air conditioners for processing and storage of hygroscopic material, vapor condensers for milk evaporation, food freezing and frozen storage refrigeration is described and illustrated in Bulletin 134 issued by Niagara Blower Company, 405 Lexington Ave., New York 17, N. Y.

Bulletin on Ice Makers

A BULLETIN on shell ice makers has been issued by the Frick Company, Waynesboro, Pa. Users of shell ice are listed and illustrated, including bars and

Vilter floor-mounted, flooded, fin coiled, two-speed air unit cools the beef chill room.

restaurants, fruit and vegetable shippers, food processors, hospitals and institutions, hotels and motels, dairies, fishing boats, ice plants. The shell-ice process is fully described, with pictures; also pictures of various installations are shown, together with sizes and other specifications.

New Ammonia Unit

CATALOG (Number 13C6a) for a new product, an Ammonia Unit with Hot Gas Defrost Pan, for use in hot gas defrost systems, has been released by The Recold Corp., Los Angeles, Calif. Included in the catalog is a graphic illustration of the new product along with dimensions and specifications for ammonia direct expansion with defrost pan and ammonia flooded with defrost pan. Since contractors have various ideas on how to control hot gas systems, Recold officials are not recommending any specific control system.

Recold at 7250 E. Slauson, Los Angeles, California.

Wound Rotor Motors

CONSTRUCTION features of Allis-Chalmers wound rotor motors for a variety of industrial refrigeration and air conditioning applications are described in a bulletin recently released by the company. The motors are designed for use wherever high starting torque with low starting current is needed, power supply is limited, intermediate speeds are required, smooth acceleration is desired, or where high inertia loads must be accelerated.

The motors are available in open-type models, both drip and splash-proof designs; in totally-enclosed, fan-cooled and totally-enclosed, non-ventilated machines, NEMA 505 frame and smaller, and in totally-enclosed, fan-cooled design with tube-type, air-to-air heat exchangers in frames larger than NEMA 505. Copies of the bulletin, "Allis-Chalmers Wound Rotor Motors," 51B8195A, are available on request from Allis-Chalmers Manufacturing Company, 983 S. 70th St., Milwaukee, Wisc.

Bulletin on Algae Control

SIMPLE, low-cost, way to stop algae problems in cooling systems through use of an algaecide is described in a leaflet released by Allis-Chalmers Manufacturing Company. A complex organic rosin base liquid, the new algaecide weighs approximately one pound per pint. It is simple to apply and only normal safety precautions are observed in use. A table illustrates its effectiveness on six different species of algae.

No. 120 Series Algaecide, it is reported as being used in numerous industries to successfully control algae and other microscopic organisms which complicate the overall water treatment program in cooling systems. Copies of "No. 120 Series Algaecide," Bulletin 28x8434, are available on request from Allis-Chalmers Manufacturing Company, 983 S. 70th St., Milwaukee, Wisc.

Classified Advertising

All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for USED equipment.

RATES: 20c per word; minimum 25 words. $2.00 per line for bold face headings: $15.00 per inch for line listings.

Positions and Help Wanted

WANTED — Refrigeration Engineer; frozen food plant located in Michigan. Must be experienced in operating and maintenance. Earnings over $5000. per year. Opportunity for advancement. Ammonia plant capacity about 150 tons. Write Box JA-8, c/o Industrial Refrigeration.

HAVE PERMANENT, YEAR-ROUND POSITION

for good, industrious ice plant engineer and maintenance mechanic; must be capable of making necessary repairs, handling upkeep and operating an 8 hour shift when necessary. Plant is 350 ton, all electric full-row pull, at large icing station. Company paid hospitalization, including family, and life insurance. Excellent opportunity for a capable man. Mutual Ice Company, P.O. Box 669, Alexandria, Virginia.

CHIEF ENGINEER WANTED

for small ice plant in South Florida. Should have some knowledge of oil engines. Write details of your qualifications and experience to P.O. Box 7531, Coral Gables 34, Fla.

ICE PLANTS—wanted & for sale

FOR SALE — Two ice plants and three vending ice docks; Las Cruces (30,000 pop.), Truth or Consequences (8,000 pop.) in sunny New Mexico. Ice sales to expanding lettuce, carrot, and cantaloupe markets; sales to 40 produce trucks/day, to turkey and geese raisers, to two army bases, and to fishermen. Plant capacities 30 and 25 ton/day; no competition and plants operate to capacity 9 months out of year. Also have Linde Welding Supply dealership and good cold storage business; money maker. Will sell all together or separate. Have legitimate reason for selling. Write Box 6, Mesilla Park, (or call JA 6 6781 in Las Cruces) New Mexico.

ICE PLANT WANTED — Export buyer now in New York City, purpose to inspect complete 20-50 ton daily ice plant; must be modern Frick, York, Vilter or equivalent machinery installed within last 10 years and available for inspection and shipment immediately. Price secondary to age and condition of machinery and completeness of plant. Must have in first letter photographs, complete inventory & final price "as is" & estimate for dismantling, match-marking, boxing, loading on railroad cars, etc. Dealers invited, but must have complete details. Write Box JA-4, c/o Industrial Refrigeration.

USED EQUIPMENT—wanted & for sale

FINNED PIPE FOR SALE—48 lengths 12' each Made from 2" steel pipe-7" square fins 1½" apart; galvanized. New at only $3.00 per foot. Also 100 steel Hand Trucks. Medium duty; roller bearing wheels. New at $6.00 each. West Side Cold Storage Co., 7 Harrison St., New York 13, N.Y.

FOR SALE

2—10"x10" 2 cyl. Frick D.C. to 100 hp motor.
2—10"x10" 2 cyl. York D.C. to 100 hp motor.
3—9"x9" 2 cyl. York D.C. to 75 hp motor.
1—8"x8" 2 cyl. Frick D.C. to 75 hp motor.
1—7¾"x5" Frick booster.
2—50 ton G.E. Freon condensing units.
1—50 ton Buffalo Freon evap. condenser.
1—6"x6" Frick compressor.
1—5"x5" York compressor.
3—9¼x14" 115 hp Wolverine Diesel engines.
11x22x47" and 11x22x51" ice cans.
Ice plant — 20 to 160 tons.

ENTERPRISE EQUIPMENT CORPORATION
77 Alexander St. Yonkers, N. Y.
Cable ENEQCO Phone: Yonkers 8-8118-9

USED EQUIPMENT—continued

WANTED—Used ice plants, all sizes and makes. Write complete details to Box OT-7, c/o Industrial Refrigeration.

FOR SALE — 4x4, 5x5, 8x8 York and Frick compressors. 7½" and 9" York crank shafts. 20" receiver. Write E. Niebling, 1546 St. Clair, Mt. Healthy, Cincinnati 31, Ohio.

WANTED — One York Model IDV-10A Industrial Dry Coil air conditioner. Please furnish full description, specifications, best price, where located, age and etc. to Box JA-9, c/o Industrial Refrigeration.

FOR SALE — Frick 6x6, Type G compressor, with G.E. 30 h.p. motor; also York 7x7 with Westinghouse 40 h.p. motor; real bargain. Chas S. Jocobowitz Corp., 3080 Main St., Buffalo 14, N.Y., Telephone AMherst 2100.

FOR SALE — Refrigeration equipment; ice equipment; new, used. Advise us your needs. Use "QUICKSEAL" — stops brine tank leaks; easy, efficient, economical. Born Company, 80 East Jackson Boulevard, Chicago 4, Illinois, WAbash 2-5299.

WANTED — York or Frick 10x10 ammonia compressor, latest model available; give motor specifications, serial numbers, age, condition, and your asking price in first letter, preferably f.o.b. cars or truck. Can also use corresponding starters, condensers, etc. Prepared to pay cash for "quick deal". Address Box JA-6, c/o Industrial Refrigeration.

FOR SALE — 13¼" x 9" Frick booster compressor. 9" x 9" Frick compressor; 75 h.p. motor. Write R. H. Bozman & Brothers, Inc., 1050 Granby St., Baltimore 2, Maryland.

FOR SALE—AMMONIA—FREON

1—3-¾x3"—8 cyl. V/W York belt driven ammonia compressor.
1—5¼"x4¼"—6 cyl. V/W York ammonia booster comp.
1—6-¾"x5"—6 cyl. V/W York booster ammonia comp.
1—25 ton Chrysler Air Temp. Freon condensing unit, complete.
1—40 ton General Electric Freon condensing unit, complete.
1—50 ton General Electric Freon condensing unit, complete.
1—50 ton Buffalo Freon evaporative condenser.

ENTERPRISE EQUIPMENT CORPORATION
79 Alexander St. Yonkers, N.Y.
Cable: ENEQCO Phone Yonkers 8-8118-9

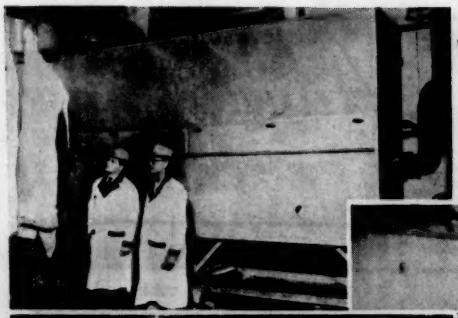
CHR. HEURICH BREWERY — WASHINGTON Sale of 4 York vertical shell & tube condensers, new 1946, ASME stamped; 2 horizontal welded steel ammonia receivers; DeLavergne 15 x 15 ammonia compressor, 280-ton, 400 h.p. synchronous motor; Vilter 15 x 15 horizontal compressor, 280-ton, "Electric Machine" 375 h.p. motor; DeLavergne 8 cylinder Diesel motor compressor unit consisting of a DeLavergne solid injection engine, 15" bore x 18" stroke on 8 cylinder Diesel crank shaft. Diesel cylinders over-hauled in late 1945. Thousands of ft. and tons of 2" galvanized ammonia pipe, fittings & accessories; conveyor, etc. Inspection invited. Offer subject to prior sale. Contact CHR. HEURICH BREWERY, 26th & D Sts., Washington 7, D.C. Telephone REpublic 7-1600.

FOR SALE
NEW EQUIPMENT — NEVER USED

310 ton York water chilling set-up complete with 300 h.p. motor, Turbo compressor, speed increaser, chiller, condenser, controls, etc.

10x10 York with V belt drive.
9x9 York with 75 h.p. motor.
8x8 York Model D8.
7¼ x 7¼ Baker w/V belt drive.
4x4 Frick self contained unit.
130 h.p. Superior Diesel engine.
14x15 Unaflow steam engine.
Condensers, receivers, motors, etc.

JOHN F. GARSON
A & Venango Sts. Philadelphia 34, Pa.
Phone GArfield 6-2221



Vilter floor-mounted, flooded, fin coiled, two-speed air unit cools the beef chill room.

The freezer door opens into an anteroom which prevents loss of cold air while the palletized meat is being moved into the room for freezing.

Two Vilter 4-cylinder VMC's and one Vilter 2-cylinder VMC booster compressor in the Juengling plant.

Q. How can a packer obtain more rapid cooling with proper humidity?

A. with Vilter REFRIGERATION EQUIPMENT

It provides dependable, modern, automatically controlled cooling and freezing...

and costs less to own*

Helping to supply America with more and better quality meat is the new, modern Gus Juengling & Son plant addition in Cincinnati, Ohio. Refrigeration for this new plant addition is furnished by two Vilter 4-cylinder VMC compressors, one Vilter 2-cylinder VMC booster compressor and a vertical unit.

The new beef chill room is cooled by a large Vilter flooded finned coiled two-speed air unit. Due to its proper design, at no time is defrosting necessary. Humidity is kept at the right level . . . even air distribution is obtained . . . shrinkage has been kept at a very low figure.

The low temperature room, in which is located a blast freezing tunnel and storage space for over 100,000 lbs. of frozen product, is served by a Vilter water defrost finned coil unit.

For proper cooling and fully automatic refrigeration for your meat packing plants, food processing plants and cold storage warehouses, specify Vilter. With Vilter you can have full confidence of Quality equipment—trouble-free . . . dependable . . . efficient performance. Vilter provides bigger profits through better cooling.

Sold and installed by Vilter distributor, C. P. Wood and Company, Cincinnati, Ohio.

* Savings in low first cost are not the complete answer when considering the installation of refrigeration equipment. But savings in terms of years of extra service, reliable performance and minimum maintenance—that's where Vilter excels in low-cost ownership.

Vilter®

QUALITY CRAFTSMANSHIP that lasts...

ENGINEERING DESIGN that guarantees performance

REFRIGERATION and AIR CONDITIONING

THE VILTER MANUFACTURING COMPANY, Milwaukee 7, Wisconsin

Air Units • Ammonia & Freon Compressors • Booster Compressors • Bandaist Coolers • Water & Brine Coolers • Blast Freezers • Evaporative & Shell & Tube Condensers • Pipe Coils • Valves & Fittings • Pakice & Polarflake Ice Machines

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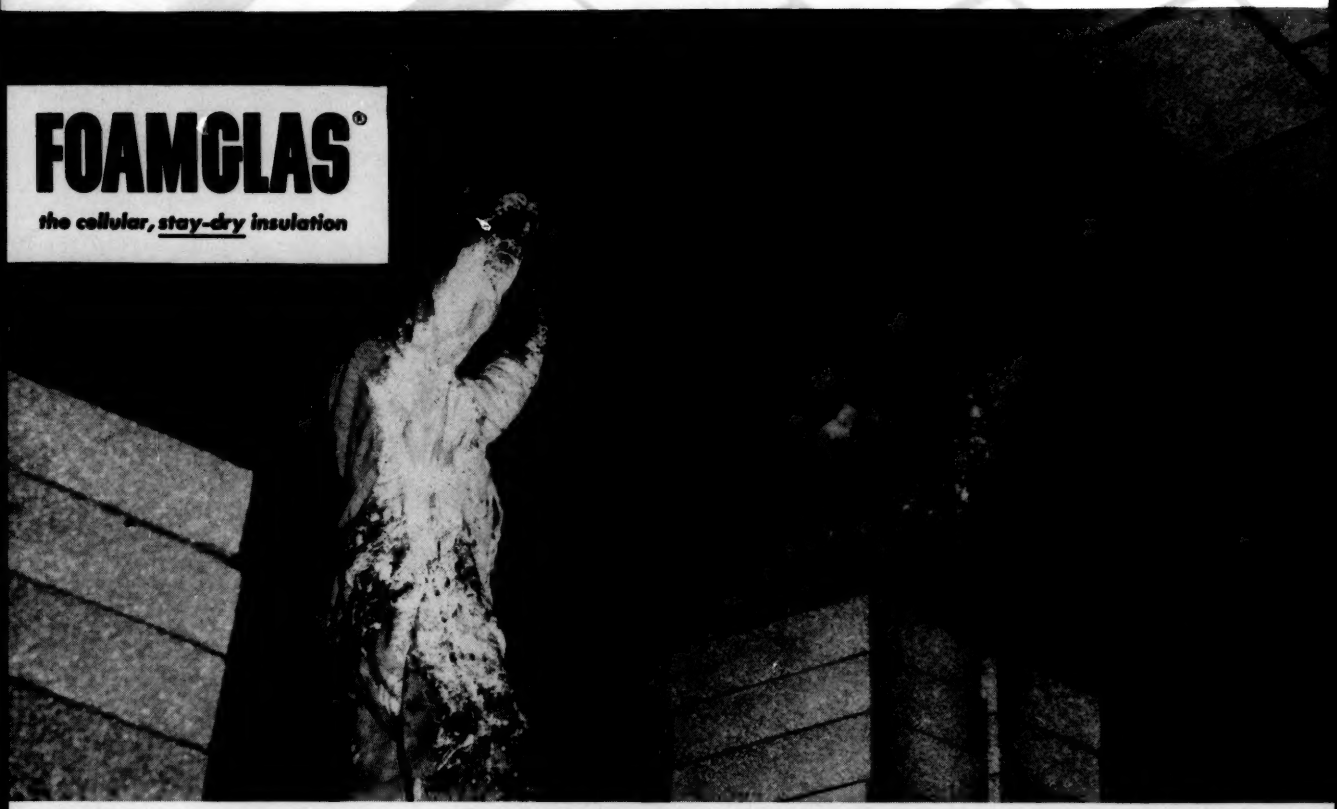
FOAMGLAS®
the cellular, stay-dry insulation



Workmen are installing lightweight, dimensionally stable blocks of 4" FOAMGLAS in T-iron ceiling of new Welch Grape Juice freezer. Free-standing walls of FOAMGLAS—which help support the ceiling—require no extra structural support because of the insulation's unusual strength and rigidity.

Welch Grape Juice saves 10% on cold room construction by insulating with strong, stay-dry FOAMGLAS

The Welch Grape Juice Company found a new money-saving technique to build freezers and coolers at plants in Brocton and Westfield, N.Y. FOAMGLAS with its unique combination of structural strength and constant insulating effectiveness, made this new technique practical.

According to Welch: "We saved valuable time and at least 10% on construction costs with our new type of low temperature enclosure for freezing and storing grape juice concentrates. Key to the design was our use of FOAMGLAS as both structural wall and insulation."

Each of the new Welch cold rooms is surrounded by an insulating envelope of FOAMGLAS. It's used in all walls without support from building structural members . . . in free-standing partitions . . . in pan and T-iron ceilings . . . and under all wearing floors. Moisture-proof FOAMGLAS is dimensionally stable, rigid and takes compressive loads of seven tons per square foot without crushing. Thus, it enabled Welch to eliminate the cost of masonry back-up or supporting studs. And separate vapor barriers were unnecessary.

This completely inorganic cellular glass material provides virtually permanent insulating effectiveness, too. As Welch concludes, "Since FOAMGLAS is moisture-proof, its efficiency doesn't fade. That keeps down the load on our refrigeration equipment. Operating costs are held at a constant low level. In fact, our refrigerating requirements for these cold rooms should be no higher in ten years than they are today."

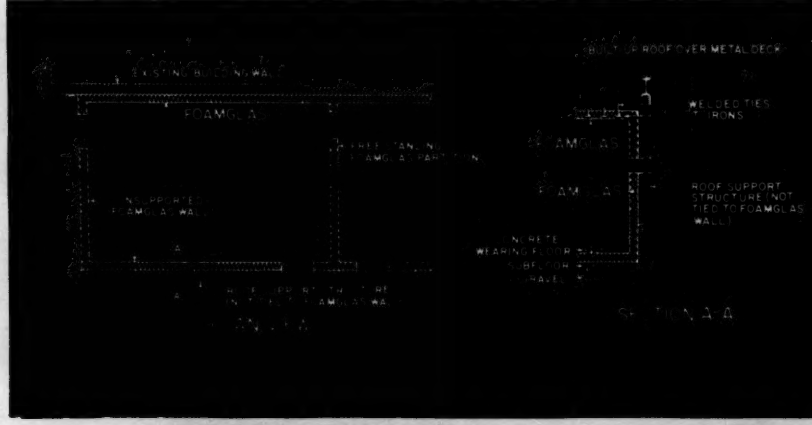
See for yourself how *you* can benefit when you insulate with FOAMGLAS. Send today for a free sample and directions for six easy tests to perform in your own office. You'll prove that FOAMGLAS is *your* ideal insulation! Write . . .

Pittsburgh Corning Corporation

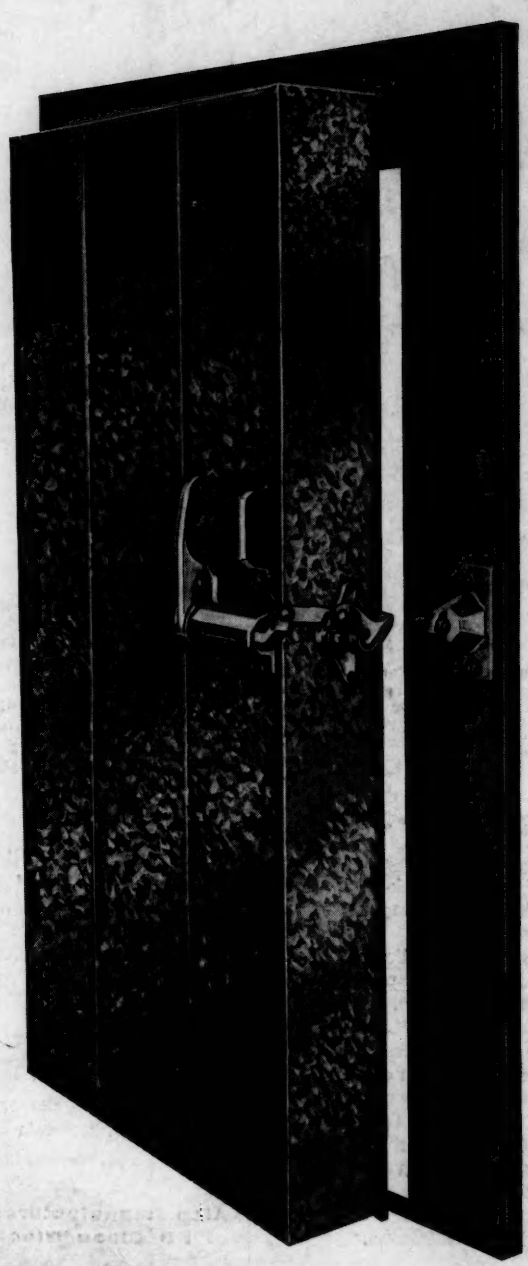
Dept. T-17, One Gateway Center
Pittsburgh 22, Pennsylvania

In Canada: 57 Bloor St. W., Toronto, Ontario

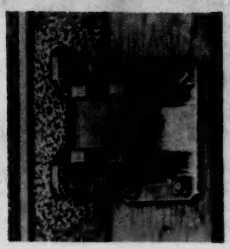
Also manufacturers of PC Glass Blocks



Detail showing use of FOAMGLAS in walls, free-standing partitions, ceiling and floor of new Welch Grape Juice freezer. Note section showing how FOAMGLAS stands free of structural supports for roof.

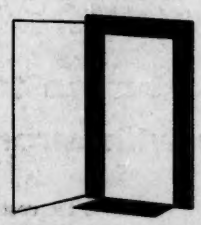


For The Finest Cold Storage Doors Specify JAMISON with these exclusive features



Exclusive JAMISON Hardware

- Rugged cast construction
- Patented heavy duty design
- Adjustable hinges and fastener assure tight seal during life of door
- Hot dip galvanized finish. Heavy coating of prime zinc gives maximum protection.



Exclusive JAMISON FROSTOP (optional feature)

- Prevents frost or ice on door frames even as low as —50°
- Prevents door from freezing shut, eliminates damage from forcing open frozen doors
- Assures tight seal at all times, prolongs gasket life.

ZEROSEAL GASKET

TRIPLE SILLSEAL GASKET

Exclusive JAMISON Gasketing

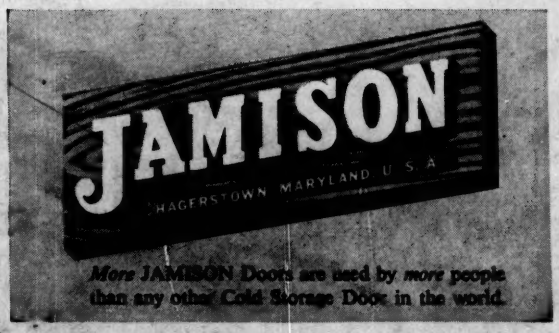
"Zeroseal"

- Wide, flat seal
- Extends around sides and top
- Extra resilient and pliable

"Sillseal"

- Triple Wiper Seal
- Flexible, abrasion and grease-resistant
- No capillarity

Full details on the Jamison Super Freezer Door are contained in Bulletin #5. Write for your copy to Jamison Cold Storage Door Co., Hagerstown, Md.



More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.